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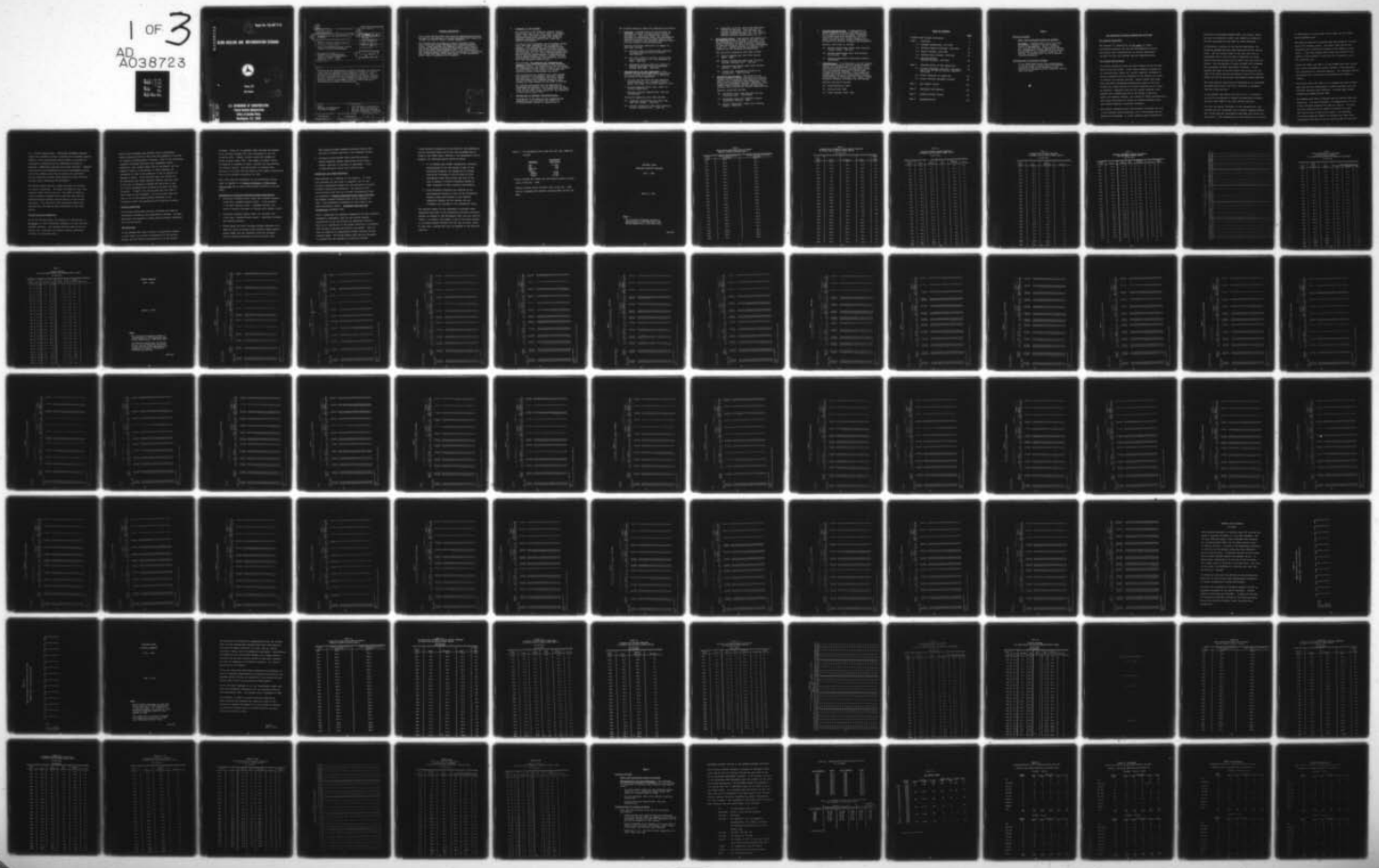

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UG3RD BASELINE AND IMPLEMENTATION SCENARIO

January 1977

Final Report

U.S. DEPARTMENT OF TRANSPORTATION
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16. Abstract

The Baseline and Implementation Scenario describes the environment within which the Upgraded Third Generation (UG3RD) Air Traffic Control System components may be expected to operate. This environment is described by such parameters as forecast demands, aircraft characteristics and distribution, and airport configurations and locations. It also includes considerations of implementation such as establishment criteria, funding services, establishment strategies, and scheduling.

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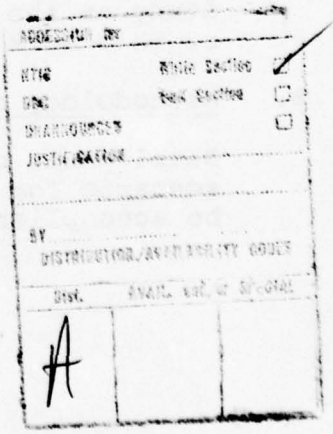
PROGRAM DESCRIPTION

This volume contains data and narrative descriptions utilized as input to the analysis of various Upgraded Third Generation (UG3RD) Air Traffic Control System components.

All forecast data is based on Aviation Forecasts Fiscal Years 1975-1986, dated September 1974, unless otherwise noted. These forecasts are somewhat higher than those of the latest forecast publication--Aviation Forecast Fiscal Years 1977-1988, dated September 1976. The differences in the forecasts result primarily from differences in assumptions and in base year data which were inputs to the econometric models used in preparing the forecasts.



A. Statement of the Problem

Any evolution of the UG3RD air traffic control system must involve two major areas of consideration. The first area is the UG3RD "physical" characteristics which includes such titles as component operating capabilities, costs and support requirements.

The second area encompasses the environment within which the UG3RD components may be expected to operate. This environment is described by such parameters as forecast demands, aircraft characteristics and distribution, airport configurations and locations, et. al. Also, subsumed within this second area are considerations of implementation such as establishment criteria, funding services, establishment strategies, and scheduling (initial and final operating capabilities).

This program, The Baseline and Implementation Scenario, deals with the second of the two above referenced areas. The scenario will set the stage for subsequent efforts which introduce the "physical" characteristics of the system in an attempt to ascertain system effectiveness and worth.

Some interaction and feedback will exist between the analysis of the system's "physical" characteristics and its environment but by the large, the environment work (baseline scenario) will precede all other aspects of the UG3RD evaluation.

All efforts associated with the baseline and implementation scenario will be completed by the first week of June 1975. The August 1974 DOT Staff Study on the UG3RD review called for the completion of this work by April 1975.

B. Methodology or Approach (Task/Activities)

Development of the baseline and implementation scenario for the 1980-2000 time frame will be accomplished through the undertaking of

the following specific tasks and associated activities:

1. Forecasts - Forecast data will be provided on national, regional, hub and airport levels of aggregation. Data so provided will include forecasts of operations; RPM's' and enplanements. Operations will be further broken down to such relevant categories as: IFR/VFR; itinerant/local; G.A./air carrier; towered/nontowered.

   Specific activities identified in support of this task include:

   (a) Identify types of forecast data necessary to support benefit/cost activities. (AVP-100/200)

   (b) Cull from existing sources, as much data as are available, e.g., all forecasts to 1986. (AVP-120)

   (c) Supplement existing data with efforts to develop additional data for forecasts between 1986-2000. (AVP-120)

2. Characteristics of User Operations - As a minimum, the following additional information will be provided as background in depicting the nature of user operations:

   - G.A./air carrier fleet mix and operating characteristics, e.g., operating costs; range; and number of aircraft types in fleet.
   - Airline personnel force size; nature of airline competition.
   - Aircraft avionics capabilities, cost and distribution.

   Activities supporting this task include:

   (a) Establish coordination and input from NASA R&D efforts. (AVP-110)

   (b) Extract appropriate input from "Aviation Futures" contract work. (AVP-110)

(c) Supplement existing inputs with additional efforts as required. Such efforts will include coordination with FEA, CAB, user planning representatives, e.g., air carrier, general aviation, manufacturers, et. al.

3. The Airport Status - The airport environment will be described in its evolution to the year 2000. This description will include a treatise of new airport locations; airport inventory; expansions of existing airports; shifts in airport functional roles, e.g., general aviation to reliever; and terminal air and landside considerations.

The activities supporting this task include:

(a) Extract appropriate input from current NASP. (ASP)

(b) Extract appropriate input from "Aviation Futures" contract work. (AVP-110)

(c) Coordinate and obtain input from Airports Service. (AVP-100)

(d) Develop new, supplemental material as appropriate. (AVP-110/120)

4. Regulatory and Economic - The nature of the national aviation system regulatory and economic climate will be detailed with specific attention paid to route structuring (CAB authority); cost allocation; government subsidies (ADAP/PGP); head taxes; airport curfews, quotas, and peak hour pricing; and international related considerations.

Specific activities include:

(a) Coordinate input from head tax and cost allocation work. (AVP-2/200)

(b) Coordinate input from ADAP/PGP renewed legislation efforts. (ASP)

(c) Extract appropriate inputs from industry papers. (AVP-120)

5. Limiting System Factors - A description of system constraints will be provided as well as an attempt to quantify those constraints with system operating parameters. Specific constraint areas will include energy; airspace; airport access; airport terminal area; strategic raw building (industry and government).

   Specific activities to include:

   (a) Extract appropriate inputs from "Aviation Futures" work. (AVP-110)

   (b) Extract appropriate input from existing R&D studies. (AED)

   (c) Develop supplemental contractual efforts. (AED/MITRE)

6. Implementation - In conjunction with the descriptions of the national aviation system provided through the accomplishment of the above cited tasks and activities, an implementation scheme will be developed covering all UG3RD items (excluding FSS and AEROSAT). This scheme will include (for each of the UG3RD items treated) establishment criteria; implementation strategy (distribution of facilities, e.g., hubs); implementation schedule (including IOC and funding.

   Specific activities include:

   (a) Scope Definition (ASP)

   (b) Initial Draft (ASP)

   (c) Final Scenario Input (ASP)

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Task 1

Original Program:

Task 1 was originally stated as follows:

Forecasts - Forecast data will be provided on national, regional, hub and airport levels of aggregation. Data so provided will include forecasts of operations; RPM's; and enplanements. Operations will be further broken down to such relevant categories as: IFR/VFR; itinerant/local; G.A./air carrier; towered/nontowered.

Modifications to Original Program:

It was determined during the accomplishment of the work that forecast data at nontowered locations would not be required for the benefit-cost analyses and was therefore omitted from this task.

FAA Operations Forecast Assumptions 1975-2000

Air Carrier Operations

The forecast of "operations" by all users is a most significant parameter for FAA facility/manpower planning. The factors that influenced the air carrier operations forecast and then the methods used are explained below.

Air Carrier RPM Forecast

Air carrier operations form one major segment of the workload borne by FAA facilities. Since future changes in demand for air transportation affect air carrier planning, forecasts of revenue passenger miles as measures of that demand are needed to forecast air carrier activity. Recent events have shown that previously forecasted accelerating growth in both the economy as a whole and the air carrier industry can no longer be expected. Expansion into new air carrier markets, which account for a sizable portion of the growth in previous years, now appears limited. As a result of these considerations, the present forecasts for growth in revenue passenger miles have slowed compared to previous forecasts.

The current forecasts differ from previous forecasts not only in the forecast values generated, but in the methods used to develop the estimates. A linear equation model relating the

historical relationship between RPM's, air fares, income, the cost of automotive travel, and industrial production has been developed and was used for these forecasts.

To determine a forecast of air carrier operations, the following assumptions were made concerning the air carrier fleet. The air carrier fleet in the near term will be influenced most by the continued introduction of three-engine wide-body aircraft and 727-200's into the trunkline fleets. The introduction of these aircraft will accompany the retirement of older four-engine aircraft. It was assumed that most of the old nonfan four-engine jets and some of the older fan-jet four-engine jets will be retired before the FAR 36 sound level requirements become effective.

The local service fleet will be influenced by the continued introduction of DC-9's and 737's, both new or purchased from the trunk carriers.

It was assumed that during the late 1970's a new smaller jet will be introduced to replace the remaining turboprop aircraft being used by the local service carriers.

For this air carrier forecast, it was assumed that a new aircraft will be introduced with a seating capacity between the 727-200 and the three-engine wide-body jets during the late 1970's. The introduction of this aircraft will be used

to some extent to retire some of the older two- and three-engine standard jets.

The seating capacity by airplane type was assumed to increase during the forecast period. The first class section was decreased with a resulting increase in the number of coach seats. It was also assumed that during the mid-1970's the number of seats abreast in each row will increase by one on the wide-body jets.

During the 1980's and 1990's it was assumed that each carrier will obtain progressively larger aircraft to meet partially the requirement for increased capacity. The increased capacity requirement will also be met by increasing the number of flights.

During the 1980's and 1990's it is assumed that most development work will be concentrated on making aircraft more fuel efficient and more cost efficient. No other major design changes are assumed through 2000.

Two methods were used to forecast the air carrier fleet and operations. The first forecast is a summarization of individual forecasts prepared for each air carrier. The base for this forecast was the number of aircraft, by type, each carrier has on hand and on order. The estimates for future types and numbers of aircraft were made after discussions with many of the air carriers and all the major

U.S. aircraft manufacturer. Additional estimated aircraft orders were assumed in order to provide for increased capacity needed to carry anticipated traffic growth, to provide for retirement of aircraft and for individual airlines to maintain a competitive position with other airlines. Judgment, influenced by the discussions held with knowledgeable people within the industry, was used to project the individual carrier fleets by aircraft types beyond the years for which aircraft order information was available.

The second method used was a model developed to forecast air carrier operations. The model forecasts for the total industry rather than by carrier. The model is based on linear equations developed from historical data and the interrelationship between various factors in air carrier operations. The results of this forecasting model were substantially the same as those determined by the first method.

General Aviation Operations

As was stated previously, the forecast of "operations" by all users is a most significant parameter for FAA facility/manpower planning. The approach used and some of the key factors that influenced the general aviation operations forecast are explained below.

Most of the forecasts were derived from an econometric model relating the size of the fleet and measures of activity to economic and demographic variables. Some of the significant exogenous variables used were real disposable income, population, real liquid assets held by the public, and the number of towers in the system. A trend variable was introduced in some of the equations to try to account for changes in costs. Since the model does not include all the variables that affect general aviation activity, such as the cost of regulation changes and the price of gas, the initial estimates were adjusted to account for these variables. A simple time series model was also used to derive some of the forecasts. The time series model was used to see if the growth pattern generated by the econometric model was consistent with historical changes.

Military Operations

All military operational activity forecasts are based on information provided by the Department of Defense. Military operations are forecast to remain nearly constant throughout the forecast period.

FAA Facilities

It was assumed that there would be no significant changes in user taxes, the current configuration of the enroute system, and the current configuration of flight service

stations. Stage III of expanded radar services was assumed at 42 stations through 1977, then increasing to all IFR towers by 1979. Terminal control areas were assumed to remain constant after 1975. The number of airport towers is expected to increase at about 1 percent per year through the forecast period. The projections of terminal area activity to the year 2000 are based on the economic assumptions used in the national projections to 2000.

For a more explicit discussion of the methodology, please refer to Appendix A in Aviation Forecasts - Fiscal Years 1975 to 1986 and to other working papers written by AVP-120 staff.

Description of Collision Avoidance System Alternatives

1. Collision Avoidance Device (CAD)--for aircraft at/below 12,500 lbs., maximum takeoff weight. A CAD provides "I am here" signals to CAS - equipped aircraft, but does not receive, process, or display such signals itself.

2. Collision Avoidance System (CAS)--for aircraft over 12,500 lbs., maximum takeoff weight. Receives, processes and displays signals.

3. Ground-based Collision Avoidance System--referred to as DABS-IPC, which is based on the Discrete Address Beacon System (DABS) and the automated collision avoidance service called Intermittent Positive Control (IPC).

This system provides automated proximity warning and collision avoidance services to all equipped aircraft.

4. Microwave Landing System (MLS)--provides multiple landing approach pattern capabilities which allow a tighter "packing" of aircraft on approaches. Level of sophistication varies with aircraft size.

Assumptions for UG3RD Evaluation

Fleet equipage is a function of two factors: (1) fleet size forecasts for the years in question, and (2) the avionics requirements assumed for the particular collision avoidance system being evaluated. The baseline fleet size forecasts stem from our in-house forecasting efforts as presented in Aviation Forecasts Fiscal Years 1975-1986. The assumed required equipage date for the analysis is 1988. This assumption corresponds to that given in the MITRE Corporation report: Investment Costs for CAS Alternatives (December 1974).

Table 1 summarizes the equipage assumptions for this analysis. Incremental investment costs are the initial capital expenditures to buy and install the additional avionics. They do not include any of the annual recurring or investment costs needed to operate and maintain the system. That is, they are additive to expenditures already required to meet existing needs. The ground system costs are not allocated to aircraft but are assumed to be borne by DOT/FAA.

A more detailed discussion of the source of the assumptions and the rationale which led to the cost estimates may be found in the MITRE report (Section 4 and Appendixes B and C). However, the following points should be noted:

1. It is assumed that ATCRBS transponders (currently prerequisites of the ATC system in much of the controlled airspace) are assumed to be already carried by 70 percent of the GA fleet by 1988. Incremental costs thus reflect the cost to the user of adding a collision avoidance system by 1988, exclusive of other airspace requirements.

2. Since encoding altimeters are required on all participating aircraft in each of the alternative systems, these costs cancel in the relative comparison between the two systems and are, therefore, not included in the incremental costs.

The relative impact of the incremental investment costs associated with each of the alternative collision avoidance systems is evident in the forecasted fleet size and activity levels. In general, the impact of any of the above systems is to reduce general aviation and air taxi activity levels by less than 1 percent per year as compared to the baseline scenario.

Table 1: GA Incremental Unit Costs for CAS, CAD, DABS-IPC, and MLS

Equipment	Incremental Unit Cost
CAS	$ 1,800
CAD	900
DABS-IPC	500
MLS:*	
small	2,200
medium	7,700
large	15,200

* Small includes all single and twin-engine piston aircraft under 12,500 lbs. TOGW.

Medium includes piston aircraft over 12,500 lbs. TOGW and all turboprop and turbojet aircraft under 20,000 lbs. TOGW.

NATIONAL LEVEL

BASELINE AVIATION FORECAST

1975 - 2000

April 9, 1975

Note:

The following forecasts presume a continuation of 3RD Generation ATC System capability to the year 2000.

AVP-120

Table 1

UNITED STATES CERTIFICATED ROUTE AIR CARRIER
DOMESTIC SCHEDULED PASSENGER TRAFFIC

Fiscal Year	Revenue Passenger-Miles (Billions)	Revenue Passenger Enplanements (Millions)
1975	140.5	200.7
1976	153.1	215.3
1977	166.8	231.0
1978	181.3	247.8
1979	194.9	262.3
1980	208.2	276.1
1981	221.0	288.5
1982	233.2	301.7
1983	246.0	315.0
1984	259.5	328.9
1985	275.8	346.0
1986	285.8	355.0
1987	298.6	369.1
1988	312.1	383.9
1989	326.1	399.1
1990	340.8	415.1
1991	356.2	431.8
1992	372.2	448.4
1993	388.9	466.3
1994	405.3	483.7
1995	422.3	502.1
1996	440.0	520.7
1997	458.5	540.7
1998	477.8	561.5
1999	497.8	588.2
2000	518.7	604.5

Table 2

ESTIMATED TOTAL ITINERANT AND LOCAL AIRCRAFT OPERATIONS
AT AIRPORT WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

Fiscal Year	Total	Itinerant	Local	Number of Towers
1975	61.6	38.1	23.5	427
1976	66.4	40.8	25.6	432
1977	69.4	42.6	26.8	437
1978	72.6	44.6	28.0	442
1979	75.5	46.4	29.1	447
1980	78.6	48.3	30.3	452
1981	86.1	52.0	34.1	457
1982	93.5	55.7	37.8	461
1983	100.9	59.4	41.5	466
1984	107.9	63.1	44.8	471
1985	115.9	66.8	49.1	476
1986	123.4	70.5	52.9	481
1987	130.4	72.9	57.5	486
1988	138.9	76.8	62.1	491
1989	148.7	81.4	67.3	496
1990	159.0	86.0	73.0	500
1991	165.6	89.3	76.3	505
1992	172.1	92.5	79.6	510
1993	178.5	95.6	82.9	515
1994	185.1	98.9	86.2	519
1995	191.5	102.0	89.5	524
1996	198.1	105.3	92.8	529
1997	204.5	108.4	96.1	534
1998	211.0	111.6	99.4	539
1999	217.6	114.9	102.7	544
2000	224.1	118.1	106.0	549

Table 3

ESTIMATED ITINERANT AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military
1975	38.1	9.8	2.5	24.4	1.4
1976	40.8	10.3	2.6	26.5	1.4
1977	42.6	10.7	2.7	27.8	1.4
1978	44.6	11.2	2.9	29.1	1.4
1979	46.4	11.6	3.0	30.4	1.4
1980	48.3	12.0	3.1	31.8	1.4
1981	52.0	12.3	3.4	34.9	1.4
1982	55.7	12.6	3.9	37.8	1.4
1983	59.4	12.9	4.2	40.9	1.4
1984	63.1	13.2	4.5	44.0	1.4
1985	66.8	13.5	4.7	47.2	1.4
1986	70.5	13.8	5.0	50.3	1.4
1987	72.9	14.0	5.4	52.0	1.5
1988	76.8	14.3	5.8	55.2	1.5
1989	81.4	14.8	6.2	58.9	1.5
1990	86.0	15 2	6.6	62.7	1.5
1991	89.3	15.6	6.9	65.3	1.5
1992	92.5	16.0	7.1	67.9	1.5
1993	95.6	16.3	7.4	70.4	1.5
1994	98.9	16.7	7.7	73.0	1.5
1995	102.0	17.0	8.0	75.5	1.5
1996	105.3	17.4	8.3	78.1	1.5
1997	108.4	17.8	8.5	80.6	1.5
1998	111.6	18.1	8.8	83.2	1.5
1999	114.9	18.5	9.1	85 .7	1.6
2000	118.1	18.8	9.4	88.3	1 .6

Table 4

ESTIMATED LOCAL AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

Fiscal Year	Total	General Aviation	Military
1975	23.5	21.8	1.7
1976	25.6	23.9	1.7
1977	26.8	25.1	1.7
1978	28.0	26.3	1.7
1979	29.1	27.4	1.7
1980	30.3	28.6	1.7
1981	34.1	32.4	1.7
1982	37.8	36.2	1.6
1983	41.5	39.9	1.6
1984	44.8	43.2	1.6
1985	49.1	47.5	1.6
1986	52.9	51.3	1.6
1987	57.5	55.8	1.7
1988	62.1	60.4	1.7
1989	67.3	65.6	1.7
1990	73.0	71.2	1.8
1991	76.3	74.5	1.8
1992	79.6	77.8	1.8
1993	82.9	81.1	1.8
1994	86.2	84.4	1.8
1995	89.5	87.7	1.8
1996	92.8	91.0	1.8
1997	96.1	94.3	1.8
1998	99.4	97.6	1.8
1999	102.7	100.8	1.9
2000	106.0	104.1	1.9

Table 5

ESTIMATED INSTRUMENT OPERATIONS AT AIRPORTS
WITH FAA TRAFFIC CONTROL SERVICE
(In millions)

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military	Number TCA's
1975	26.2	9.8	1.5	10.7	4.2	23
1976	27.6	10.3	1.6	11.5	4.2	23
1977	28.7	10.7	1.7	12.1	4.2	23
1978	32.1	11.2	1.9	14.8	4.2	23
1979	35.4	11.6	2.0	17.6	4.2	23
1980	37.6	12.0	2.1	19.3	4.2	23
1981	40.3	12.3	2.4	21.4	4.2	23
1982	43.0	12.6	2.6	23.6	4.2	23
1983	46.1	12.9	2.8	26.2	4.2	23
1984	48.8	13.2	3.0	28.4	4.2	23
1985	51.5	13.5	3.4	30.4	4.2	23
1986	54.2	13.8	3.6	32.6	4.2	23
1987	56.6	14.0	3.8	34.6	4.2	23
1988	59.2	14.3	4.1	36.6	4.2	23
1989	61.9	14.8	4.4	38.5	4.2	23
1990	64.7	15.2	4.8	40.5	4.2	23
1991	67.2	15.6	5.0	42.4	4.2	23
1992	69.8	16.0	5.2	44.4	4.2	23
1993	72.2	16.3	5.4	46.3	4.2	23
1994	74.8	16.7	5.6	48.3	4.2	23
1995	77.3	17.0	5.9	50.2	4.2	23
1996	79.9	17.4	6.1	52.2	4.2	23
1997	82.4	17.8	6.3	54.1	4.2	23
1998	84.9	18.1	6.5	56.1	4.2	23
1999	87.4	18.5	6.7	58.0	4.2	23
2000	90.0	18.8	7.0	60.0	4.2	23

Table 6

ESTIMATED IFR AIRCRAFT HANDLED, IFR DEPARTURES, AND OVERS BY USER CATEGORY.
FAA AIR ROUTE TRAFFIC CONTROL CENTERS

(In millions)

Fiscal Year	Total			Air Carrier			Air Taxi			General Aviation			Military		
	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs
1975	24.5	9.6	5.3	12.9	4.8	3.3	1.1	.5	.1	6.2	2.7	.8	4.3	1.6	1.1
1976	25.5	10.0	5.5	13.4	5.0	3.4	1.3	.6	.1	6.5	2.8	.9	4.3	1.6	1.1
1977	26.5	10.4	5.7	13.9	5.2	3.5	1.3	.6	.1	7.0	3.0	1.0	4.3	1.6	1.1
1978	27.9	11.0	5.9	14.6	5.5	3.6	1.5	.7	.1	7.5	3.2	1.1	4.3	1.6	1.1
1979	29.1	11.5	6.1	15.1	5.7	3.7	1.7	.8	.1	8.0	3.4	1.2	4.3	1.6	1.1
1980	29.8	11.8	6.2	15.4	5.8	3.8	1.7	.8	.1	8.4	3.6	1.2	4.3	1.6	1.1
1981	31.5	12.5	6.5	15.7	5.9	3.9	2.1	1.0	.1	9.4	4.0	1.4	4.3	1.6	1.1
1982	33.4	13.3	6.8	16.2	6.1	4.0	2.3	1.1	.1	10.6	4.5	1.6	4.3	1.6	1.1
1983	35.0	14.0	7.0	16.5	6.2	4.1	2.5	1.2	.1	11.7	5.0	1.7	4.3	1.6	1.1
1984	36.6	14.7	7.2	16.8	6.3	4.2	2.7	1.3	.1	12.8	5.5	1.8	4.3	1.6	1.1
1985	38.4	15.5	7.4	17.1	6.4	4.3	3.1	1.5	.1	13.9	6.0	1.9	4.3	1.6	1.1
1986	40.0	16.2	7.6	17.4	6.5	4.4	3.3	1.6	.1	15.0	6.5	2.0	4.3	1.6	1.1
1987	42.9	17.5	7.9	18.2	6.8	4.6	3.7	1.8	.1	16.7	7.3	2.1	4.3	1.6	1.1
1988	45.1	18.5	8.1	18.7	7.0	4.7	3.9	1.9	.1	18.2	8.0	2.2	4.3	1.6	1.1
1989	47.7	19.7	8.3	19.2	7.2	4.8	4.3	2.1	.1	19.9	8.8	2.3	4.3	1.6	1.1
1990	50.4	20.9	8.6	19.8	7.4	5.0	4.5	2.2	.1	21.8	9.7	2.4	4.3	1.6	1.1
1991	52.3	21.7	8.9	20.3	7.6	5.1	4.8	2.3	.2	22.9	10.2	2.5	4.3	1.6	1.1
1992	53.7	22.3	9.1	20.6	7.7	5.2	5.0	2.4	.2	23.8	10.6	2.6	4.3	1.6	1.1
1993	55.3	23.0	9.3	21.1	7.9	5.3	5.0	2.4	.2	24.9	11.1	2.7	4.3	1.6	1.1
1994	57.2	23.8	9.6	21.7	8.1	5.5	5.2	2.5	.2	26.0	11.6	2.8	4.3	1.6	1.1
1995	58.8	24.5	9.8	22.2	8.3	5.6	5.4	2.6	.2	26.9	12.0	2.9	4.3	1.6	1.1
1996	60.4	25.2	10.0	22.5	8.4	5.7	5.6	2.7	.2	28.0	12.5	3.0	4.3	1.6	1.1
1997	62.2	26.0	10.2	23.0	8.6	5.8	5.8	2.8	.2	29.1	13.0	3.1	4.3	1.6	1.1
1998	63.7	26.6	10.5	23.6	8.8	5.9	5.8	2.8	.2	30.1	13.4	3.3	4.3	1.6	1.1
1999	65.5	27.4	10.7	24.0	9.0	6.0	6.0	2.9	.2	31.2	13.9	3.4	4.3	1.6	1.1
2000	67.1	28.1	10.9	24.3	9.1	6.1	6.2	3.0	.2	32.3	14.4	3.5	4.3	1.6	1.1

Table 7

TOTAL FLIGHT SERVICES, PILOT BRIEFS
AND FLIGHT PLANS ORGINATED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/TOWERS

(In millions)

Fiscal Year	Total Flight Services	Pilot Briefs	Flight Plans Originated		
			Total	IFR-DVER	VFR
1975	62.7	17.5	8.4	5.4	3.0
1976	69.2	19.6	9.3	6.1	3.2
1977	75.8	21.8	10.1	6.8	3.3
1978	80.9	23.5	10.7	7.3	3.4
1979	87.7	25.9	11.4	7.9	3.5
1980	95.6	28.7	12.3	8.6	3.7
1981	106.5	32.3	13.6	9.7	3.9
1982	117.5	35.8	15.0	10.9	4.1
1983	128.7	39.4	16.4	12.0	4.4
1984	139.7	42.9	17.8	13.2	4.6
1985	150.9	46.5	19.2	14.3	4.9
1986	162.1	50.1	20.6	15.4	5.2
1987	179.4	56.2	22.6	17.3	5.3
1988	197.1	62.4	24.5	19.0	5.5
1989	216.3	68.8	26.7	20.9	5.8
1990	237.5	76.1	29.1	23.0	6.1
1991	249.2	80.0	30.5	24.2	6.3
1992	260.6	83.9	31.8	25.3	6.5
1993	272.4	87.8	33.2	26.5	6.7
1994	283.9	91.7	34.6	27.7	6.9
1995	295.7	95.6	36.0	28.9	7.1
1996	307.2	99.5	37.3	30.0	7.3
1997	318.1	103.4	38.7	31.2	7.5
1998	330.8	107.3	40.2	32.4	7.8
1999	342.6	111.3	41.6	33.6	8.0
2000	354.1	115.2	42.9	34.7	8.2

Table 8

AIRCRAFT CONTACTED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/ TOWERS

(In millions)

Fiscal Year	Total	IFR-DVFR	VFR	Air Carrier	Air Taxi	General Aviation	Military
1975	10.9	2.1	8.8	.3	.8	9.1	.7
1976	11.4	2.4	9.0	.3	.8	9.6	.7
1977	12.0	2.7	9.3	.3	.9	10.1	.7
1978	12.5	3.0	9.5	.3	1.0	10.6	.7
1979	13.1	3.3	9.8	.3	1.0	11.1	.7
1980	13.6	3.6	10.0	.3	1.1	11.5	.7
1981	14.7	4.1	10.6	.3	1.2	12.5	.7
1982	15.9	4.6	11.3	.3	1.3	13.6	.7
1983	17.1	5.1	12.0	.3	1.4	14.7	.7
1984	18.3	5.6	12.7	.3	1.5	15.8	.7
1985	19.5	6.2	13.3	.3	1.6	16.9	.7
1986	20.7	6.8	13.9	.3	1.8	17.9	.7
1987	21.8	7.8	14.0	.3	1.9	18.9	.7
1988	23.3	8.8	14.5	.3	2.1	20.2	.7
1989	25.3	10.2	15.1	.3	2.2	22.1	.7
1990	27.1	11.4	15.7	.3	2.4	23.7	.7
1991	28.2	12.0	16.2	.3	2.5	24.7	.7
1992	29.2	12.6	16.6	.3	2.6	25.6	.7
1993	30.4	13.3	17.1	.3	2.7	26.7	.7
1994	31.3	13.8	17.5	.3	2.8	27.5	.7
1995	32.5	14.5	18.0	.3	2.9	28.5	.7
1996	33.6	15.1	18.5	.3	3.0	29.6	.7
1997	33.9	15.7	18.2	.3	3.1	29.8	.7
1998	35.8	16.4	19.4	.3	3.3	31.5	.7
1999	36.8	17.0	19.8	.3	3.4	32.4	.7
2000	37.9	17.6	20.3	.3	3.5	33.4	.7

CENTER FORECAST

1975 - 2000

April 9, 1975

Note:

The following forecasts presume a continuation of 3RD Generation ATC system capability to the year 2000.

It should be noted that the Center data is not sufficiently sensitive to the various UG3RD implementation scenarios to require alternative forecast projections.

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Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY

REGION- PACIFIC

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	499	163	112	1	50	173	1	0	3	94	1	75
1971	450	151	103	1	46	148	0	0	3	84	1	60
1972	477	168	107	1	59	141	0	0	3	82	1	55
1973	536	192	114	2	77	152	0	0	4	74	1	72
1974	450	174	117	5	52	102	0	0	4	64	1	33
1975	451	162	116	2	44	127	0	0	4	83	1	40
1976	468	170	124	2	44	128	0	0	3	84	1	39
1977	483	178	132	3	44	127	0	0	4	83	2	38
1978	501	186	139	3	44	129	0	0	4	85	2	38
1979	514	191	144	3	44	132	0	0	4	88	2	38
1980	522	194	147	3	44	134	0	0	4	90	2	38
1981	531	197	149	4	44	137	0	0	4	92	2	38
1982	543	202	154	4	44	139	0	0	4	95	2	38
1983	552	205	157	4	44	142	0	0	4	97	3	38
1984	560	208	159	5	44	144	0	0	4	100	3	38
1985	590	228	179	5	43	134	0	0	3	95	3	33
1986	598	231	182	6	43	136	0	0	3	97	3	33
1987	620	240	190	6	43	140	0	0	3	101	3	33
1988	629	243	193	7	43	143	0	0	3	103	3	33
1989	649	252	202	8	43	145	0	0	3	106	3	33
1990	668	259	207	8	43	150	0	0	3	110	3	33
1991	682	265	213	9	43	152	0	0	3	112	4	33
1992	690	268	216	9	43	154	0	0	3	114	4	33
1993	705	274	221	9	43	157	0	0	3	117	4	33
1994	721	280	227	10	43	161	0	0	3	121	4	33
1995	736	286	232	10	43	164	0	0	3	123	4	33
1996	744	289	235	11	43	166	0	0	3	125	4	33
1997	758	295	241	11	43	168	0	0	3	128	4	33
1998	773	301	246	11	43	171	0	0	3	130	5	33
1999	787	307	252	12	43	173	0	0	3	132	5	33
2000	795	310	255	12	43	175	0	0	3	134	5	33

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- ALASKAN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	301	117	70	19	27	67	13	2	11	26	0	15
1971	263	101	60	14	27	61	12	1	11	25	0	13
1972	257	98	55	17	26	61	13	1	9	28	0	11
1973	233	91	49	18	24	51	11	1	8	23	0	9
1974	244	99	55	22	22	46	11	1	7	21	0	6
1975	275	109	56	29	23	57	13	2	7	26	0	8
1976	283	113	58	33	22	57	14	2	7	26	0	8
1977	292	117	59	37	22	58	14	2	7	26	0	8
1978	307	124	62	40	22	59	14	2	7	27	0	8
1979	319	129	64	43	22	61	15	2	7	28	0	8
1980	326	132	66	45	22	62	15	2	7	29	0	8
1981	341	139	67	51	22	63	16	3	7	29	0	8
1982	361	149	69	57	22	65	16	3	7	30	0	8
1983	376	155	70	63	22	66	16	3	7	31	0	8
1984	392	162	71	69	22	68	17	3	7	32	0	8
1985	418	178	64	98	16	62	15	4	8	28	0	8
1986	436	186	65	105	16	64	15	4	8	29	0	8
1987	470	202	68	118	16	66	16	4	8	30	0	8
1988	495	214	69	129	16	67	16	4	8	31	0	8
1989	528	230	72	142	16	68	17	4	8	31	0	8
1990	560	245	74	155	16	70	18	5	8	33	1	8
1991	582	255	76	163	16	72	18	5	8	33	1	8
1992	597	262	77	169	16	73	18	5	8	34	1	8
1993	616	271	79	176	16	74	19	5	8	34	1	8
1994	636	280	81	183	16	76	19	5	8	36	1	8
1995	656	289	83	190	16	78	20	6	8	36	1	8
1996	675	298	84	198	16	79	20	6	8	37	1	8
1997	694	307	86	205	16	80	20	6	8	38	1	8
1998	711	315	88	211	16	81	21	6	8	38	1	8
1999	731	324	90	218	16	83	21	6	8	39	1	8
2000	750	333	91	226	16	84	21	7	8	40	1	8

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY **(Continued)**

REGION - NORTHWEST

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
						DOMESTIC				OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	563	258	159	53	46	47	8	1	37	0	0	0
1971	556	252	151	56	44	52	9	1	41	0	0	0
1972	559	256	137	73	47	47	10	2	35	0	0	0
1973	566	262	139	75	47	42	9	2	32	0	0	0
1974	632	299	138	102	58	34	7	3	25	0	0	0
1975	641	298	146	110	42	45	13	3	29	0	0	0
1976	678	315	158	117	41	48	15	4	30	0	0	0
1977	707	328	164	123	41	51	16	4	30	0	0	0
1978	746	347	173	133	41	52	17	5	30	0	0	0
1979	781	364	180	144	41	53	17	5	30	0	0	0
1980	801	374	183	150	41	53	18	5	30	0	0	0
1981	850	398	186	171	41	54	18	6	30	0	0	0
1982	904	424	192	192	41	56	19	7	30	0	0	0
1983	953	448	195	212	41	57	19	7	30	0	0	0
1984	1001	472	198	233	41	57	20	7	30	0	0	0
1985	1068	500	209	255	37	68	24	12	32	0	0	0
1986	1115	523	211	275	37	69	24	13	32	0	0	0
1987	1205	567	221	309	37	71	25	13	32	0	0	0
1988	1268	598	224	337	37	72	26	14	32	0	0	0
1989	1355	641	234	371	37	73	26	14	32	0	0	0
1990	1439	682	241	405	37	75	28	15	32	0	0	0
1991	1495	709	247	425	37	77	28	16	32	0	0	0
1992	1536	729	250	442	37	78	29	17	32	0	0	0
1993	1585	753	257	459	37	79	29	17	32	0	0	0
1994	1639	779	263	479	37	81	30	18	32	0	0	0
1995	1688	803	270	496	37	82	31	19	32	0	0	0
1996	1737	827	273	517	37	83	31	19	32	0	0	0
1997	1792	854	280	537	37	84	32	20	32	0	0	0
1998	1834	874	286	551	37	86	32	21	32	0	0	0
1999	1889	901	293	571	37	87	33	22	32	0	0	0
2000	1936	924	296	592	37	88	34	22	32	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- WESTERN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	2047	873	586	93	194	301	62	8	131	65	1	34
1971	2055	871	570	91	210	313	68	8	138	61	0	37
1972	1964	859	495	94	270	246	58	7	93	60	0	27
1973	1945	876	526	111	239	193	55	7	59	51	1	21
1974	1914	861	492	135	234	192	57	8	62	41	3	20
1975	1988	877	522	152	202	234	67	12	71	63	1	21
1976	2082	921	550	165	206	240	71	14	70	65	1	20
1977	2178	966	580	178	208	246	74	16	69	67	1	20
1978	2280	1014	613	193	208	252	76	17	69	68	1	20
1979	2359	1051	636	207	208	257	78	19	69	70	1	20
1980	2405	1072	647	217	208	261	81	19	69	72	1	20
1981	2494	1113	658	247	208	268	83	21	69	74	1	20
1982	2605	1165	680	277	208	275	85	24	69	76	2	20
1983	2693	1206	691	306	208	281	87	26	69	78	2	20
1984	2778	1246	702	336	208	286	89	27	69	80	2	20
1985	3058	1381	742	420	218	296	97	37	64	82	2	14
1986	3154	1426	754	454	218	302	99	39	64	84	2	14
1987	3346	1517	789	510	218	312	104	41	64	87	2	14
1988	3464	1573	800	554	218	318	106	43	64	89	2	14
1989	3652	1664	835	610	218	324	108	44	64	91	2	14
1990	3820	1743	858	666	218	334	113	46	64	95	3	14
1991	3942	1800	882	700	218	342	115	50	64	97	3	14
1992	4029	1840	893	728	218	349	117	52	64	99	3	14
1993	4137	1891	916	756	218	355	119	54	64	101	3	14
1994	4261	1948	940	790	218	365	124	56	64	105	3	14
1995	4369	1999	963	818	218	371	126	57	64	106	3	14
1996	4465	2044	974	851	218	377	128	59	64	108	3	14
1997	4585	2101	998	885	218	383	131	61	64	110	3	14
1998	4683	2146	1021	907	218	391	133	65	64	112	4	14
1999	4803	2203	1044	941	218	397	135	67	64	114	4	14
2000	4899	2248	1056	974	218	403	137	68	64	116	4	14

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- ROCKY MOUNTAIN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1153	312	216	42	55	529	385	19	125	0	0	0
1971	1165	316	208	50	57	533	386	21	127	0	0	0
1972	1189	334	207	65	62	521	374	21	126	0	0	0
1973	1206	362	216	77	69	482	356	25	101	0	0	0
1974	1232	379	225	86	67	474	341	29	104	0	0	0
1975	1286	387	226	108	53	512	380	34	98	0	0	0
1976	1339	407	237	116	54	525	388	38	100	0	0	0
1977	1402	431	252	125	53	540	399	42	100	0	0	0
1978	1468	456	267	136	53	556	410	46	100	0	0	0
1979	1523	476	276	146	53	571	422	49	100	0	0	0
1980	1558	488	281	153	53	582	433	49	100	0	0	0
1981	1629	514	286	174	53	601	445	57	100	0	0	0
1982	1708	544	296	195	53	620	456	65	100	0	0	0
1983	1775	570	301	216	53	635	467	68	100	0	0	0
1984	1843	596	306	237	53	651	479	72	100	0	0	0
1985	1980	659	326	281	51	662	482	82	98	0	0	0
1986	2049	686	332	304	51	677	493	86	98	0	0	0
1987	2181	739	347	341	51	703	515	90	98	0	0	0
1988	2267	774	352	371	51	719	526	94	98	0	0	0
1989	2388	827	367	409	51	734	538	98	98	0	0	0
1990	2510	875	377	446	51	760	560	103	98	0	0	0
1991	2596	908	388	469	51	780	571	111	98	0	0	0
1992	2657	931	393	488	51	795	582	115	98	0	0	0
1993	2730	960	403	506	51	810	594	119	98	0	0	0
1994	2823	993	413	529	51	837	616	123	98	0	0	0
1995	2896	1022	423	548	51	852	627	127	98	0	0	0
1996	2968	1050	429	570	51	868	638	131	98	0	0	0
1997	3047	1082	439	593	51	883	650	135	98	0	0	0
1998	3118	1108	449	608	51	902	661	144	98	0	0	0
1999	3198	1140	459	630	51	918	672	148	98	0	0	0
2000	3269	1168	464	653	51	933	683	152	98	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- CENTRAL

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	989	374	227	83	66	237	133	31	74	0	0	0
1971	1024	378	208	106	64	268	156	38	73	0	0	0
1972	954	361	179	107	75	232	137	35	60	0	0	0
1973	979	373	178	131	64	233	135	41	56	0	0	0
1974	1000	381	174	148	58	238	137	46	54	0	0	0
1975	1084	419	192	166	62	246	145	54	47	0	0	0
1976	1144	444	205	176	63	256	150	60	46	0	0	0
1977	1198	466	216	186	64	266	154	67	46	0	0	0
1978	1265	494	228	201	64	277	158	73	46	0	0	0
1979	1323	518	237	217	64	287	163	79	46	0	0	0
1980	1356	532	241	227	64	292	167	79	46	0	0	0
1981	1442	567	245	258	64	308	172	91	46	0	0	0
1982	1537	606	253	289	64	325	176	103	46	0	0	0
1983	1619	642	257	320	64	335	180	109	46	0	0	0
1984	1700	677	261	351	64	346	185	115	46	0	0	0
1985	1804	723	275	383	66	358	189	126	43	0	0	0
1986	1885	758	280	413	66	369	194	132	43	0	0	0
1987	2028	822	292	464	66	384	202	139	43	0	0	0
1988	2129	867	297	505	66	395	207	145	43	0	0	0
1989	2267	931	310	556	66	405	211	151	43	0	0	0
1990	2402	991	318	607	66	420	220	158	43	0	0	0
1991	2497	1030	327	638	66	437	224	170	43	0	0	0
1992	2568	1060	331	663	66	448	229	176	43	0	0	0
1993	2647	1094	340	689	66	459	233	183	43	0	0	0
1994	2740	1133	348	719	66	474	242	189	43	0	0	0
1995	2819	1167	357	745	66	485	246	195	43	0	0	0
1996	2899	1202	361	775	66	495	251	202	43	0	0	0
1997	2988	1241	370	806	66	506	255	208	43	0	0	0
1998	3063	1270	378	826	66	523	260	221	43	0	0	0
1999	3152	1309	387	857	66	534	264	227	43	0	0	0
2000	3232	1344	391	887	66	544	268	233	43	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- GREAT LAKES

		DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
FISCAL YEAR	AIRCRAFT HANDLED	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	4999	1891	1276	499	116	1217	876	163	177	0	0	0
1971	4756	1775	1115	549	111	1206	868	170	168	0	0	0
1972	5038	1876	1107	656	113	1286	913	190	183	0	0	0
1973	5430	2051	1108	821	122	1328	924	231	173	0	0	0
1974	5495	2106	1093	897	115	1283	872	260	151	0	0	0
1975	5840	2236	1133	1006	97	1368	942	284	141	0	0	0
1976	6045	2315	1161	1060	94	1415	963	312	141	0	0	0
1977	6261	2399	1192	1114	92	1465	987	338	140	0	0	0
1978	6642	2559	1261	1207	92	1524	1015	369	140	0	0	0
1979	6979	2698	1307	1299	92	1583	1043	400	140	0	0	0
1980	7177	2783	1330	1361	92	1611	1072	400	140	0	0	0
1981	7685	2992	1353	1547	92	1701	1100	461	140	0	0	0
1982	8236	3223	1398	1733	92	1790	1128	523	140	0	0	0
1983	8713	3432	1421	1918	92	1849	1156	554	140	0	0	0
1984	9188	3640	1444	2104	92	1908	1184	584	140	0	0	0
1985	9164	3639	1387	2175	77	1886	1191	562	133	0	0	0
1986	9611	3835	1409	2349	77	1941	1219	590	133	0	0	0
1987	10405	4190	1474	2639	77	2025	1274	618	133	0	0	0
1988	10967	4443	1496	2871	77	2081	1302	646	133	0	0	0
1989	11733	4799	1561	3161	77	2137	1330	674	133	0	0	0
1990	12484	5132	1604	3451	77	2220	1385	703	133	0	0	0
1991	13002	5349	1647	3625	77	2304	1413	759	133	0	0	0
1992	13392	5516	1669	3770	77	2360	1440	787	133	0	0	0
1993	13824	5704	1712	3915	77	2416	1468	815	133	0	0	0
1994	14341	5921	1756	4089	77	2499	1524	843	133	0	0	0
1995	14775	6110	1799	4234	77	2555	1551	871	133	0	0	0
1996	15221	6305	1921	4408	77	2611	1579	899	133	0	0	0
1997	15712	6523	1864	4592	77	2666	1607	927	133	0	0	0
1998	16114	6682	1907	4698	77	2750	1634	984	133	0	0	0
1999	16604	6899	1951	4872	77	2806	1662	1012	133	0	0	0
2000	17052	7095	1972	5046	77	2862	1690	1040	133	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- SOUTHWEST

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	2982	1255	596	182	486	472	214	37	200	7	1	14
1971	2949	1202	554	179	470	545	224	39	266	8	1	7
1972	3065	1230	515	244	471	605	210	45	328	12	1	8
1973	3204	1307	520	276	511	590	225	51	289	15	1	9
1974	3202	1308	541	301	466	586	228	58	281	13	1	5
1975	3566	1470	548	382	540	626	248	71	284	13	2	8
1976	3689	1519	578	409	532	651	261	80	285	14	2	9
1977	3810	1568	603	435	529	674	272	89	287	14	2	9
1978	3969	1639	638	472	529	691	280	97	287	15	2	9
1979	4103	1698	661	508	529	707	288	105	287	15	2	9
1980	4183	1734	673	532	529	715	296	105	287	16	2	9
1981	4376	1818	684	605	529	740	303	121	287	16	3	9
1982	4593	1914	708	677	529	765	311	138	287	16	3	9
1983	4777	1998	719	750	529	781	319	146	287	17	3	9
1984	4962	2082	731	822	529	798	327	154	287	17	4	9
1985	5321	2227	752	941	534	867	348	179	303	22	5	11
1986	5513	2314	764	1017	534	885	356	188	303	22	5	11
1987	5862	2475	799	1142	534	912	373	197	303	23	6	11
1988	6103	2587	811	1242	534	929	381	206	303	24	6	11
1989	6443	2746	846	1368	534	947	389	215	303	24	6	11
1990	6768	2897	870	1493	534	974	405	224	303	25	6	11
1991	6991	2995	893	1569	534	1001	413	242	303	26	7	11
1992	7158	3070	905	1632	534	1018	421	251	303	26	7	11
1993	7348	3156	928	1694	534	1036	429	260	303	27	7	11
1994	7573	3255	952	1770	534	1063	446	269	303	28	8	11
1995	7762	3341	975	1832	534	1080	454	277	303	28	8	11
1996	7954	3429	987	1908	534	1098	462	286	303	29	8	11
1997	8170	3527	1011	1983	534	1116	470	295	303	29	8	11
1998	8345	3601	1034	2033	534	1143	478	313	303	30	9	11
1999	8561	3700	1058	2108	534	1161	486	322	303	30	9	11
2000	8753	3787	1069	2184	534	1179	494	331	303	31	9	11

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- SOUTHERN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	4211	1528	932	270	327	1155	523	122	259	191	22	37
1971	4346	1571	935	287	349	1204	558	130	260	195	23	37
1972	4717	1715	863	445	407	1287	597	153	278	189	42	27
1973	4905	1813	912	512	389	1279	607	176	234	197	43	21
1974	4933	1829	918	564	347	1275	622	184	218	194	41	15
1975	5284	1956	918	696	342	1372	625	231	220	203	70	22
1976	5524	2043	953	743	348	1438	644	258	221	214	79	22
1977	5775	2135	994	789	352	1505	667	284	222	221	88	23
1978	6080	2258	1051	855	352	1564	686	310	222	228	96	23
1979	6347	2362	1089	921	352	1623	705	336	222	234	104	23
1980	6499	2425	1108	965	352	1649	724	336	222	240	104	23
1981	6894	2576	1127	1097	352	1742	743	388	222	246	120	23
1982	7325	2745	1166	1228	352	1835	762	439	222	253	136	23
1983	7686	2896	1185	1360	352	1894	781	465	222	259	144	23
1984	8047	3047	1204	1491	352	1953	800	491	222	265	152	23
1985	8698	3314	1248	1694	372	2070	834	514	233	292	172	24
1986	9067	3468	1268	1829	372	2131	854	540	233	299	181	24
1987	9724	3753	1326	2055	372	2218	892	565	233	313	190	24
1988	10184	3953	1346	2235	372	2278	912	591	233	320	198	24
1989	10813	4237	1404	2461	372	2339	931	617	233	326	207	24
1990	11429	4502	1443	2687	372	2425	970	643	233	340	216	24
1991	11874	4677	1482	2823	372	2520	989	694	233	347	233	24
1992	12199	4809	1502	2935	372	2581	1009	720	233	354	241	24
1993	12563	4961	1541	3048	372	2641	1028	745	233	360	250	24
1994	12998	5135	1580	3184	372	2728	1067	771	233	374	259	24
1995	13363	5287	1619	3297	372	2789	1086	797	233	381	267	24
1996	13733	5442	1638	3432	372	2849	1106	822	233	388	276	24
1997	14144	5617	1677	3568	372	2910	1125	848	233	394	284	24
1998	14496	5746	1716	3658	372	3004	1145	900	233	401	302	24
1999	14905	5920	1755	3793	372	3065	1164	925	233	408	310	24
2000	15275	6075	1775	3929	372	3125	1183	951	233	415	319	24

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- EASTERN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	2825	1174	820	209	146	477	270	63	68	60	1	15
1971	2746	1133	765	215	153	480	280	60	63	59	1	16
1972	2869	1183	763	251	169	503	276	66	63	77	3	19
1973	2891	1172	742	285	145	547	314	73	49	89	4	19
1974	2867	1165	701	321	143	537	307	77	42	90	4	18
1975	3124	1295	768	380	147	534	288	100	47	79	4	15
1976	3254	1349	799	402	148	556	296	111	47	82	5	15
1977	3363	1393	823	422	148	577	304	122	48	84	5	15
1978	3552	1476	871	457	148	600	312	133	48	86	5	15
1979	3709	1543	902	493	148	623	321	144	48	89	6	15
1980	3798	1582	918	516	148	634	330	144	48	91	6	15
1981	4004	1668	934	587	148	668	339	167	48	94	7	15
1982	4244	1771	966	657	148	702	347	189	48	96	8	15
1983	4439	1857	981	727	148	725	356	200	48	98	8	15
1984	4633	1943	997	798	148	747	365	211	48	101	9	15
1985	4813	2025	1011	866	148	763	370	219	47	103	9	15
1986	5007	2111	1027	936	148	785	378	230	47	106	9	15
1987	5364	2273	1074	1051	148	818	396	241	47	110	10	15
1988	5605	2382	1090	1143	148	841	404	252	47	113	10	15
1989	5953	2545	1138	1259	148	863	413	263	47	115	11	15
1990	6281	2692	1169	1374	148	897	430	274	47	120	11	15
1991	6516	2793	1201	1444	148	930	439	296	47	122	12	15
1992	6685	2866	1217	1502	148	953	447	307	47	125	13	15
1993	6885	2955	1248	1559	148	975	456	318	47	127	13	15
1994	7121	3054	1280	1629	148	1009	473	329	47	132	14	15
1995	7323	3146	1311	1686	148	1031	482	339	47	134	14	15
1996	7515	3231	1327	1756	148	1053	490	350	47	137	14	15
1997	7740	3332	1359	1825	148	1076	499	361	47	139	15	15
1998	7930	3410	1390	1871	148	1110	507	383	47	142	16	15
1999	8152	3510	1422	1940	148	1132	516	394	47	144	16	15
2000	8346	3596	1438	2010	148	1154	525	405	47	146	17	15

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

REGION- NEW ENGLAND

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1036	414	258	92	65	208	137	17	54	0	0	0
1971	1017	403	242	96	66	211	135	20	55	0	0	0
1972	932	374	202	109	63	184	115	20	50	0	0	0
1973	950	379	196	122	60	192	120	14	57	0	0	0
1974	915	363	181	129	53	189	120	15	54	0	0	0
1975	959	390	174	168	48	179	112	31	36	0	0	0
1976	996	405	179	178	47	186	116	35	36	0	0	0
1977	1034	422	186	188	47	190	117	38	35	0	0	0
1978	1093	448	197	204	47	197	120	42	35	0	0	0
1979	1146	471	204	219	47	204	123	45	35	0	0	0
1980	1177	485	208	230	47	207	127	45	35	0	0	0
1981	1257	520	212	261	47	217	130	52	35	0	0	0
1982	1344	558	219	292	47	228	133	59	35	0	0	0
1983	1420	593	222	324	47	234	137	63	35	0	0	0
1984	1497	629	226	355	47	241	140	66	35	0	0	0
1985	1492	628	207	383	38	236	129	74	33	0	0	0
1986	1567	662	210	413	38	243	132	78	33	0	0	0
1987	1698	723	220	464	38	252	138	81	33	0	0	0
1988	1793	767	223	505	38	259	141	85	33	0	0	0
1989	1920	827	233	556	38	266	144	89	33	0	0	0
1990	2046	885	239	607	38	276	150	93	33	0	0	0
1991	2130	922	246	638	38	286	153	100	33	0	0	0
1992	2195	951	249	663	38	293	156	104	33	0	0	0
1993	2265	983	256	689	38	299	159	107	33	0	0	0
1994	2349	1020	262	719	38	309	165	111	33	0	0	0
1995	2420	1052	269	745	38	316	168	115	33	0	0	0
1996	2492	1085	272	775	38	322	171	118	33	0	0	0
1997	2573	1122	278	806	38	329	174	122	33	0	0	0
1998	2638	1149	285	826	38	340	177	130	33	0	0	0
1999	2718	1186	291	857	38	346	180	133	33	0	0	0
2000	2793	1220	294	887	38	353	183	137	33	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

BALBOA

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	48	13	10	0	2	23	0	0	0	19	1	3
1971	44	11	9	0	2	22	0	0	0	19	1	3
1972	44	9	8	0	1	25	0	0	0	22	1	3
1973	62	18	14	1	3	26	2	0	0	21	1	2
1974	76	24	18	2	4	28	5	0	0	19	1	2
1975	56	17	14	1	2	23	0	0	0	20	1	2
1976	52	14	12	1	2	24	0	0	0	20	1	2
1977	54	15	12	1	2	25	0	0	0	21	1	2
1978	56	16	13	1	2	25	0	0	0	22	1	2
1979	58	16	14	1	2	26	0	0	0	22	2	2
1980	59	16	14	1	2	27	0	0	0	23	2	2
1981	61	17	14	1	2	27	0	0	0	23	2	2
1982	63	17	15	1	2	28	0	0	0	24	2	2
1983	64	18	15	1	2	29	0	0	0	25	2	2
1984	66	18	15	1	2	30	0	0	0	25	2	2
1985	64	17	13	2	2	30	0	0	0	26	2	2
1986	65	17	13	2	2	31	0	0	0	26	3	2
1987	68	18	14	3	2	32	0	0	0	28	3	2
1988	70	19	14	3	2	33	0	0	0	28	3	2
1989	72	19	14	3	2	34	0	0	0	29	3	2
1990	75	20	15	4	2	35	0	0	0	30	3	2
1991	77	21	15	4	2	36	0	0	0	31	3	2
1992	79	21	15	4	2	37	0	0	0	31	3	2
1993	80	21	16	4	2	37	0	0	0	32	3	2
1994	83	22	16	4	2	39	0	0	0	33	4	2
1995	85	23	17	4	2	40	0	0	0	34	4	2
1996	86	23	17	5	2	40	0	0	0	34	4	2
1997	88	24	17	5	2	41	0	0	0	35	4	2
1998	90	24	18	5	2	42	0	0	0	35	4	2
1999	92	25	18	5	2	43	0	0	0	36	4	2
2000	93	25	18	5	2	43	0	0	0	37	4	2

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

SAN JUAN

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	284	89	76	6	8	107	4	1	1	80	7	14
1971	311	103	90	6	7	105	3	1	1	80	6	13
1972	304	100	47	47	6	104	4	1	1	82	8	8
1973	309	103	47	49	6	104	3	1	1	83	9	7
1974	264	82	47	33	3	100	3	1	1	83	8	5
1975	368	129	49	75	5	111	3	1	1	86	14	6
1976	389	137	52	80	5	115	3	1	1	88	16	6
1977	411	145	55	86	4	121	4	1	1	91	17	6
1978	436	155	58	93	4	125	4	1	1	94	19	6
1979	459	165	60	100	4	129	4	1	1	96	21	6
1980	473	171	61	105	4	132	5	1	1	99	21	6
1981	510	186	63	119	4	138	5	2	1	101	24	6
1982	549	202	65	133	4	144	5	2	1	104	27	6
1983	584	218	66	148	4	149	5	2	1	107	28	6
1984	619	233	67	162	4	153	5	2	1	109	30	6
1985	689	261	70	188	3	167	4	2	1	116	38	6
1986	726	277	72	203	3	172	4	2	1	119	40	6
1987	790	306	75	228	3	179	5	2	1	124	42	6
1988	837	327	76	248	3	184	5	2	1	127	44	6
1989	899	355	79	273	3	189	5	2	1	130	46	6
1990	961	382	81	298	3	197	5	3	1	135	48	6
1991	1002	399	84	313	3	203	5	3	1	138	51	6
1992	1034	413	85	325	3	208	5	3	1	140	53	6
1993	1068	428	87	338	3	213	5	3	1	143	55	6
1994	1110	445	89	353	3	221	6	3	1	149	57	6
1995	1144	460	91	365	3	225	6	3	1	151	59	6
1996	1181	476	92	380	3	230	6	3	1	154	61	6
1997	1221	493	95	395	3	235	6	3	1	157	63	6
1998	1252	505	97	405	3	242	6	4	1	159	67	6
1999	1291	522	99	420	3	247	6	4	1	162	68	6
2000	1328	539	100	435	3	251	6	4	1	165	70	6

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

OAKLAND

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1010	398	259	38	100	214	30	3	81	65	1	34
1971	1020	399	247	42	111	221	36	3	84	61	0	37
1972	941	387	204	46	138	167	27	3	49	60	0	27
1973	894	387	218	50	119	121	23	3	22	51	1	21
1974	892	388	204	64	120	117	25	3	25	41	3	20
1975	952	399	217	74	107	154	30	5	35	63	1	21
1976	995	420	230	81	109	156	31	6	34	65	1	20
1977	1035	438	242	88	109	158	32	7	32	67	1	20
1978	1081	460	256	95	109	162	32	8	32	68	1	20
1979	1118	476	265	102	109	165	33	8	32	70	1	20
1980	1140	486	270	107	109	168	34	8	32	72	1	20
1981	1183	505	274	122	109	172	35	9	32	74	1	20
1982	1235	529	284	137	109	176	36	11	32	76	2	20
1983	1277	548	288	151	109	180	37	11	32	78	2	20
1984	1319	568	293	166	109	184	38	12	32	80	2	20
1985	1444	634	307	218	109	177	39	16	24	82	2	14
1986	1492	656	312	235	109	181	40	17	24	84	2	14
1987	1585	699	326	264	109	187	41	18	24	87	2	14
1988	1645	727	331	287	109	191	42	18	24	89	2	14
1989	1736	771	346	316	109	195	43	19	24	91	2	14
1990	1819	809	355	345	109	201	45	20	24	95	3	14
1991	1878	836	365	363	109	206	46	22	24	97	3	14
1992	1920	855	370	377	109	209	47	22	24	99	3	14
1993	1972	880	379	392	109	213	48	23	24	101	3	14
1994	2033	907	389	409	109	220	50	24	24	105	3	14
1995	2084	931	398	423	109	223	50	25	24	106	3	14
1996	2133	953	403	441	109	227	51	26	24	108	3	14
1997	2190	980	413	458	109	231	52	26	24	110	3	14
1998	2237	1001	422	470	109	235	53	28	24	112	4	14
1999	2295	1028	432	487	109	239	54	29	24	114	4	14
2000	2343	1050	437	505	109	243	55	30	24	116	4	14

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

NEW YORK

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1538	671	520	118	33	196	75	16	29	60	1	15
1971	1438	614	468	115	31	210	86	18	29	59	1	16
1972	1526	649	477	138	35	227	80	20	30	77	3	19
1973	1565	669	476	160	32	227	71	21	24	89	4	19
1974	1530	650	441	180	30	230	73	23	22	90	4	18
1975	1628	696	461	206	30	235	86	31	20	79	4	15
1976	1679	717	472	216	30	244	88	35	20	82	5	15
1977	1712	729	475	225	30	253	91	38	20	84	5	15
1978	1813	776	502	244	30	262	94	41	20	86	5	15
1979	1896	813	520	263	30	271	96	45	20	89	6	15
1980	1944	834	530	275	30	276	99	45	20	91	6	15
1981	2050	881	539	313	30	289	101	52	20	94	7	15
1982	2175	937	557	350	30	302	104	59	20	96	8	15
1983	2277	983	566	388	30	310	107	62	20	98	8	15
1984	2379	1030	575	425	30	319	109	66	20	101	9	15
1985	2362	1018	557	431	30	327	112	69	19	103	9	15
1986	2458	1061	566	466	30	336	114	72	19	106	9	15
1987	2639	1144	592	523	30	350	120	76	19	110	10	15
1988	2757	1199	600	569	30	359	122	79	19	113	10	15
1989	2933	1283	626	627	30	368	125	83	19	115	11	15
1990	3097	1358	644	684	30	382	130	86	19	120	11	15
1991	3214	1410	661	719	30	394	133	93	19	122	12	15
1992	3297	1447	670	748	30	403	135	97	19	125	13	15
1993	3399	1493	687	776	30	412	138	100	19	127	13	15
1994	3516	1545	705	811	30	426	143	104	19	132	14	15
1995	3617	1591	722	840	30	435	146	107	19	134	14	15
1996	3713	1634	731	874	30	444	148	110	19	137	14	15
1997	3825	1686	748	909	30	453	151	114	19	139	15	15
1998	3919	1727	766	932	30	466	153	121	19	142	16	15
1999	4032	1779	783	966	30	475	156	124	19	144	16	15
2000	4127	1822	792	1001	30	483	159	128	19	146	17	15

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

MIAMI

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	913	371	266	56	49	170	20	3	20	92	15	20
1971	925	373	266	56	51	180	24	3	19	96	17	21
1972	1021	418	248	102	69	184	26	5	19	86	33	16
1973	1033	429	264	107	58	175	22	3	13	93	33	12
1974	1027	429	260	119	49	170	22	2	12	92	32	9
1975	1154	469	254	158	56	216	28	4	17	98	55	14
1976	1206	487	263	168	56	233	29	5	18	105	62	14
1977	1256	505	270	178	56	246	30	6	18	109	69	14
1978	1327	535	286	193	56	257	31	6	18	112	76	14
1979	1389	560	296	208	56	268	32	7	18	115	82	14
1980	1423	575	302	218	56	272	33	7	18	119	82	14
1981	1510	610	307	248	56	290	34	8	18	122	95	14
1982	1608	650	317	277	56	307	34	9	18	125	107	14
1983	1689	685	322	307	56	318	35	9	18	128	113	14
1984	1769	720	328	337	56	329	36	10	18	131	120	14
1985	1892	760	333	371	56	372	43	8	23	151	132	16
1986	1973	795	338	401	56	384	44	8	23	154	139	16
1987	2120	860	354	450	56	400	46	9	23	161	145	16
1988	2221	905	359	490	56	411	47	9	23	165	152	16
1989	2362	970	374	540	56	423	48	10	23	168	158	16
1990	2498	1030	385	589	56	439	50	10	23	175	165	16
1991	2597	1070	395	619	56	457	51	11	23	179	178	16
1992	2668	1100	400	644	56	469	52	11	23	182	185	16
1993	2750	1135	411	668	56	480	53	12	23	186	191	16
1994	2846	1175	421	698	56	496	55	12	23	193	198	16
1995	2928	1210	432	723	56	508	56	12	23	196	205	16
1996	3009	1245	437	752	56	519	57	13	23	200	211	16
1997	3101	1285	447	782	56	531	58	13	23	203	218	16
1998	3180	1316	458	802	56	549	59	14	23	207	231	16
1999	3272	1356	468	832	56	561	60	14	23	210	238	16
2000	3353	1391	473	861	56	572	61	15	23	214	244	16

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

HOUSTON

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1087	498	227	83	187	91	23	4	42	7	1	14
1971	1056	475	221	83	171	107	25	4	62	8	1	7
1972	1181	512	205	115	192	157	27	7	101	12	1	8
1973	1195	517	194	130	193	161	31	7	99	15	1	9
1974	1098	483	190	141	152	133	35	7	71	13	1	5
1975	1237	545	218	178	149	146	31	12	79	13	2	8
1976	1287	569	230	190	149	150	33	14	79	14	2	9
1977	1334	589	239	201	149	155	35	16	79	14	2	9
1978	1398	620	253	218	149	158	36	17	79	15	2	9
1979	1453	646	262	235	149	161	37	19	79	15	2	9
1980	1486	662	267	246	149	163	38	19	79	16	2	9
1981	1567	700	271	280	149	167	39	22	79	16	3	9
1982	1657	742	281	313	149	172	40	24	79	16	3	9
1983	1736	781	285	347	149	175	41	26	79	17	3	9
1984	1816	819	290	380	149	178	42	27	79	17	4	9
1985	1936	869	294	424	150	199	43	37	81	22	5	11
1986	2017	907	299	458	150	203	44	39	81	22	5	11
1987	2162	977	313	514	150	208	46	41	81	23	6	11
1988	2266	1027	317	559	150	211	47	43	81	24	6	11
1989	2410	1097	331	616	150	215	48	44	81	24	6	11
1990	2546	1163	340	672	150	220	50	46	81	25	6	11
1991	2638	1206	350	706	150	226	51	50	81	26	7	11
1992	2707	1239	354	735	150	229	52	52	81	26	7	11
1993	2786	1277	363	763	150	233	53	54	81	27	7	11
1994	2877	1320	373	797	150	238	55	56	81	28	8	11
1995	2956	1357	382	825	150	242	56	57	81	28	8	11
1996	3036	1396	386	859	150	245	57	59	81	29	8	11
1997	3126	1439	396	893	150	249	58	61	81	29	8	11
1998	3195	1471	405	915	150	254	59	65	81	30	9	11
1999	3285	1514	414	949	150	258	60	67	81	30	9	11
2000	3366	1552	419	983	150	262	61	68	81	31	9	11

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

HONOLULU

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	416	143	105	1	37	129	0	0	3	77	1	49
1971	382	135	96	1	37	113	0	0	3	70	0	41
1972	398	148	100	1	46	102	0	0	2	68	1	31
1973	408	157	106	2	49	95	0	0	3	62	1	29
1974	374	151	109	2	40	73	0	0	2	52	1	17
1975	383	143	108	2	33	98	0	0	3	71	1	23
1976	400	150	116	2	33	99	0	0	3	72	1	23
1977	415	157	122	2	33	101	0	0	4	74	1	22
1978	432	164	129	2	33	103	0	0	4	76	1	22
1979	444	169	134	3	33	105	0	0	4	78	2	22
1980	451	172	136	3	33	107	0	0	4	80	2	22
1981	459	174	139	3	33	110	0	0	4	82	2	22
1982	471	180	143	3	33	112	0	0	4	84	2	22
1983	479	182	146	4	33	114	0	0	4	87	2	22
1984	486	185	148	4	33	116	0	0	4	89	2	22
1985	518	203	166	5	32	113	0	0	3	86	2	21
1986	526	206	169	5	32	115	0	0	3	88	3	21
1987	547	214	177	5	32	119	0	0	3	92	3	21
1988	556	217	179	6	32	121	0	0	3	94	3	21
1989	575	226	187	7	32	123	0	0	3	96	3	21
1990	590	232	192	7	32	127	0	0	3	100	3	21
1991	604	237	198	8	32	129	0	0	3	102	3	21
1992	612	240	200	8	32	132	0	0	3	104	3	21
1993	625	246	205	8	32	134	0	0	3	106	3	21
1994	640	251	211	8	32	138	0	0	3	110	4	21
1995	653	257	216	9	32	140	0	0	3	112	4	21
1996	661	260	218	9	32	142	0	0	3	114	4	21
1997	674	265	224	9	32	144	0	0	3	116	4	21
1998	687	271	229	10	32	146	0	0	3	118	4	21
1999	701	276	234	10	32	149	0	0	3	120	4	21
2000	709	279	237	10	32	151	0	0	3	122	4	21

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

ANCHORAGE

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	301	117	70	19	27	67	13	2	11	26	0	15
1971	262	101	60	14	27	61	12	1	11	25	0	13
1972	257	98	55	17	26	61	13	1	9	28	0	11
1973	232	91	49	18	24	51	11	1	8	23	0	9
1974	243	99	55	22	22	46	11	1	7	21	0	6
1975	274	109	56	29	23	57	13	2	7	26	0	8
1976	283	113	58	33	22	57	14	2	7	26	0	8
1977	292	117	59	37	22	58	14	2	7	26	0	8
1978	306	124	62	40	22	59	14	2	7	27	0	8
1979	318	129	64	43	22	61	15	2	7	28	0	8
1980	326	132	66	45	22	62	15	2	7	29	0	8
1981	342	139	67	51	22	63	16	3	7	29	0	8
1982	360	149	69	57	22	65	16	3	7	30	0	8
1983	376	155	70	63	22	66	16	3	7	31	0	8
1984	392	162	71	69	22	68	17	3	7	32	0	8
1985	417	178	64	98	16	62	15	4	8	28	0	8
1986	436	186	65	105	16	64	15	4	8	29	0	8
1987	470	202	68	118	16	66	16	4	8	30	0	8
1988	494	214	69	129	16	67	16	4	8	31	0	8
1989	528	230	72	142	16	68	17	4	8	31	0	8
1990	560	245	74	155	16	70	18	5	8	33	1	8
1991	581	255	76	163	16	72	18	5	8	33	1	8
1992	597	262	77	169	16	73	18	5	8	34	1	8
1993	615	271	79	176	16	74	19	5	8	34	1	8
1994	637	280	81	183	16	76	19	5	8	36	1	8
1995	655	289	83	190	16	78	20	6	8	36	1	8
1996	674	298	84	198	16	79	20	6	8	37	1	8
1997	695	307	86	205	16	80	20	6	8	38	1	8
1998	711	315	88	211	16	81	21	6	8	38	1	8
1999	731	324	90	218	16	83	21	6	8	39	1	8
2000	750	333	91	226	16	84	21	7	8	40	1	8

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

GUAM

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	83	20	7	0	13	44	1	0	0	17	0	26
1971	68	16	7	0	9	35	0	0	0	15	0	20
1972	79	21	7	0	13	38	0	0	0	14	0	23
1973	129	36	8	0	27	58	0	0	2	13	0	43
1974	76	23	8	3	12	30	0	0	1	12	0	16
1975	69	20	8	0	11	29	0	0	0	12	0	17
1976	69	20	9	0	11	28	0	0	0	11	0	17
1977	68	21	9	0	11	26	0	0	0	9	0	16
1978	69	21	10	0	11	26	0	0	0	9	0	16
1979	70	22	10	0	11	26	0	0	0	10	0	16
1980	71	22	10	0	11	27	0	0	0	10	0	16
1981	72	22	11	1	11	27	0	0	0	10	0	16
1982	73	23	11	1	11	27	0	0	0	10	0	16
1983	73	23	11	1	11	28	0	0	0	11	0	16
1984	74	23	11	1	11	28	0	0	0	11	0	16
1985	70	25	13	1	11	21	0	0	0	9	0	12
1986	71	25	13	1	11	21	0	0	0	9	0	12
1987	73	26	14	1	11	22	0	0	0	9	0	12
1988	74	26	14	1	11	22	0	0	0	9	0	12
1989	75	27	14	1	11	22	0	0	0	10	0	12
1990	77	27	15	1	11	22	0	0	0	10	0	12
1991	78	28	15	1	11	23	0	0	0	10	0	12
1992	79	28	15	1	11	23	0	0	0	10	0	12
1993	80	28	16	1	11	23	0	0	0	11	0	12
1994	81	29	16	1	11	23	0	0	0	11	0	12
1995	82	29	17	1	11	24	0	0	0	11	0	12
1996	83	30	17	2	11	24	0	0	0	11	0	12
1997	84	30	17	2	11	24	0	0	0	12	0	12
1998	85	30	18	2	11	24	0	0	0	12	0	12
1999	86	31	18	2	11	24	0	0	0	12	0	12
2000	87	31	18	2	11	25	0	0	0	12	0	12

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

ASHINGTON

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1287	504	300	91	113	280	195	46	39	0	0	0
1971	1309	519	297	100	122	270	194	42	34	0	0	0
1972	1342	534	287	113	134	275	197	45	33	0	0	0
1973	1327	503	266	125	113	320	244	52	24	0	0	0
1974	1338	515	261	142	113	307	234	54	20	0	0	0
1975	1495	598	307	173	118	299	203	69	27	0	0	0
1976	1574	631	328	185	118	312	208	77	27	0	0	0
1977	1653	664	348	197	118	324	213	84	27	0	0	0
1978	1739	701	369	214	118	338	219	92	27	0	0	0
1979	1813	730	382	230	118	352	225	100	27	0	0	0
1980	1854	748	389	241	118	358	231	100	27	0	0	0
1981	1955	788	395	274	118	379	237	115	27	0	0	0
1982	2069	834	409	307	118	401	243	130	27	0	0	0
1983	2162	874	415	340	118	414	249	138	27	0	0	0
1984	2254	913	422	373	118	428	255	146	27	0	0	0
1985	2451	1008	454	435	118	436	258	150	28	0	0	0
1986	2548	1050	462	470	118	449	264	158	28	0	0	0
1987	2727	1129	483	528	118	469	276	165	28	0	0	0
1988	2847	1183	490	574	118	482	282	173	28	0	0	0
1989	3019	1262	511	632	118	496	288	180	28	0	0	0
1990	3183	1334	525	690	118	515	300	188	28	0	0	0
1991	3302	1383	540	725	118	536	306	203	28	0	0	0
1992	3388	1419	547	754	118	550	312	210	28	0	0	0
1993	3488	1462	561	783	118	563	318	218	28	0	0	0
1994	3605	1511	575	818	118	583	330	225	28	0	0	0
1995	3705	1555	589	847	118	596	336	233	28	0	0	0
1996	3802	1596	596	882	118	610	342	240	28	0	0	0
1997	3914	1645	611	916	118	623	348	248	28	0	0	0
1998	4010	1683	625	940	118	644	354	263	28	0	0	0
1999	4121	1732	639	974	118	658	360	270	28	0	0	0
2000	4218	1774	646	1009	118	671	366	278	28	0	0	0

FIGURES IN THOUSANDS
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OTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued

SEATTLE

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	562	258	159	53	46	47	8	1	37	0	0	0
1971	555	252	151	56	44	52	9	1	41	0	0	0
1972	559	256	137	73	47	47	10	2	35	0	0	0
1973	566	262	139	75	47	42	9	2	32	0	0	0
1974	632	299	138	102	58	34	7	3	25	0	0	0
1975	642	298	146	110	42	45	13	3	29	0	0	0
1976	679	315	158	117	41	48	15	4	30	0	0	0
1977	706	328	164	123	41	51	16	4	30	0	0	0
1978	747	347	173	133	41	52	17	5	30	0	0	0
1979	781	364	180	144	41	53	17	5	30	0	0	0
1980	801	374	183	150	41	53	18	5	30	0	0	0
1981	850	398	186	171	41	54	18	6	30	0	0	0
1982	905	424	192	192	41	56	19	7	30	0	0	0
1983	953	448	195	212	41	57	19	7	30	0	0	0
1984	1001	472	198	233	41	57	20	7	30	0	0	0
1985	1068	500	208	255	37	68	24	12	32	0	0	0
1986	1116	523	211	275	37	69	24	13	32	0	0	0
1987	1205	567	221	309	37	71	25	13	32	0	0	0
1988	1267	598	224	337	37	72	26	14	32	0	0	0
1989	1356	641	234	371	37	73	26	14	32	0	0	0
1990	1439	682	241	405	37	75	28	15	32	0	0	0
1991	1494	709	247	425	37	77	28	16	32	0	0	0
1992	1536	729	250	442	37	78	29	17	32	0	0	0
1993	1584	753	257	459	37	79	29	17	32	0	0	0
1994	1640	779	263	479	37	81	30	18	32	0	0	0
1995	1688	803	270	496	37	82	31	19	32	0	0	0
1996	1736	827	273	517	37	83	31	19	32	0	0	0
1997	1791	854	280	537	37	84	32	20	32	0	0	0
1998	1833	874	286	551	37	86	32	21	32	0	0	0
1999	1888	901	293	571	37	87	33	22	32	0	0	0
2000	1937	924	296	592	37	88	34	22	32	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

SALT LAKE CITY

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	351	85	54	12	18	182	125	7	51	0	0	0
1971	385	98	65	16	18	188	130	7	51	0	0	0
1972	393	103	65	20	18	186	127	8	52	0	0	0
1973	400	112	69	22	21	176	124	9	44	0	0	0
1974	408	121	72	29	21	166	115	10	40	0	0	0
1975	437	126	74	36	16	185	132	12	41	0	0	0
1976	673	203	110	60	34	266	184	20	63	0	0	0
1977	703	214	117	64	34	274	189	22	63	0	0	0
1978	734	226	124	69	34	282	194	24	63	0	0	0
1979	761	236	128	74	34	289	200	26	63	0	0	0
1980	778	242	131	78	34	294	205	26	63	0	0	0
1981	814	255	133	89	34	304	211	30	63	0	0	0
1982	853	270	137	99	34	313	216	34	63	0	0	0
1983	886	283	140	110	34	321	221	36	63	0	0	0
1984	919	296	142	120	34	328	227	38	63	0	0	0
1985	1003	333	154	146	34	337	232	40	64	0	0	0
1986	1039	348	156	158	34	344	238	42	64	0	0	0
1987	1105	374	163	177	34	357	248	44	64	0	0	0
1988	1149	392	166	193	34	364	254	46	64	0	0	0
1989	1209	419	173	213	34	372	259	48	64	0	0	0
1990	1271	443	178	232	34	384	270	50	64	0	0	0
1991	1313	460	182	244	34	394	275	54	64	0	0	0
1992	1345	472	185	254	34	401	281	56	64	0	0	0
1993	1381	486	190	263	34	409	286	58	64	0	0	0
1994	1427	503	194	275	34	421	297	60	64	0	0	0
1995	1464	518	199	285	34	429	302	62	64	0	0	0
1996	1499	532	202	296	34	436	308	64	64	0	0	0
1997	1540	548	206	308	34	444	313	66	64	0	0	0
1998	1574	561	211	316	34	453	319	70	64	0	0	0
1999	1615	577	216	328	34	460	324	72	64	0	0	0
2000	1650	591	218	339	34	468	329	74	64	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

MINNEAPOLIS

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	556	220	143	47	29	116	76	4	36	0	0	0
1971	490	189	111	53	25	112	75	5	32	0	0	0
1972	736	267	144	90	32	203	151	10	42	0	0	0
1973	891	323	151	130	42	245	185	14	47	0	0	0
1974	926	351	172	140	39	224	166	14	44	0	0	0
1975	905	347	174	144	29	211	162	16	33	0	0	0
1976	946	364	181	154	28	218	167	18	33	0	0	0
1977	986	381	188	165	28	225	172	20	33	0	0	0
1978	1042	406	199	178	28	231	177	22	33	0	0	0
1979	1091	427	207	192	28	238	182	23	33	0	0	0
1980	1121	439	210	201	28	243	187	23	33	0	0	0
1981	1192	470	214	229	28	251	192	27	33	0	0	0
1982	1270	505	221	256	28	260	197	31	33	0	0	0
1983	1339	536	225	283	28	267	202	32	33	0	0	0
1984	1408	567	228	311	28	273	207	34	33	0	0	0
1985	1506	612	232	356	24	282	215	36	31	0	0	0
1986	1577	644	236	385	24	289	220	38	31	0	0	0
1987	1706	703	246	432	24	300	230	40	31	0	0	0
1988	1796	744	250	470	24	307	235	41	31	0	0	0
1989	1919	803	261	518	24	314	240	43	31	0	0	0
1990	2041	857	268	565	24	326	250	45	31	0	0	0
1991	2121	893	275	594	24	334	255	49	31	0	0	0
1992	2182	921	279	618	24	341	260	50	31	0	0	0
1993	2251	952	286	641	24	348	265	52	31	0	0	0
1994	2334	987	294	670	24	360	275	54	31	0	0	0
1995	2403	1019	301	694	24	367	280	56	31	0	0	0
1996	2474	1050	304	722	24	373	285	58	31	0	0	0
1997	2553	1086	312	751	24	380	290	59	31	0	0	0
1998	2614	1112	319	770	24	389	295	63	31	0	0	0
1999	2692	1148	326	798	24	396	300	65	31	0	0	0
2000	2763	1180	330	827	24	402	305	67	31	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

MEMPHIS

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	807	270	148	63	59	267	160	41	65	0	0	0
1971	895	307	141	73	93	281	161	44	76	0	0	0
1972	981	339	135	94	110	302	175	50	78	0	0	0
1973	1058	371	141	116	114	316	180	57	78	0	0	0
1974	1092	387	152	134	101	318	183	62	73	0	0	0
1975	1083	380	142	146	93	323	183	76	64	0	0	0
1976	1130	397	148	155	94	337	189	84	64	0	0	0
1977	1176	413	153	165	94	350	194	92	64	0	0	0
1978	1235	435	162	179	94	364	200	100	64	0	0	0
1979	1288	455	168	192	94	378	205	108	64	0	0	0
1980	1318	467	171	202	94	384	211	108	64	0	0	0
1981	1401	497	174	229	94	406	216	125	64	0	0	0
1982	1490	531	180	256	94	428	222	142	64	0	0	0
1983	1564	561	183	284	94	442	228	150	64	0	0	0
1984	1639	592	186	311	94	456	233	158	64	0	0	0
1985	1749	645	192	353	101	459	239	152	68	0	0	0
1986	1825	677	195	381	101	472	244	160	68	0	0	0
1987	1956	733	204	428	101	491	255	167	68	0	0	0
1988	2050	774	207	465	101	504	261	175	68	0	0	0
1989	2175	829	216	512	101	517	266	182	68	0	0	0
1990	2300	882	222	559	101	536	278	190	68	0	0	0
1991	2389	916	228	588	101	556	283	205	68	0	0	0
1992	2455	943	231	611	101	570	289	213	68	0	0	0
1993	2527	972	237	635	101	583	294	220	68	0	0	0
1994	2614	1007	243	663	101	601	305	228	68	0	0	0
1995	2687	1036	249	686	101	615	311	236	68	0	0	0
1996	2762	1067	252	714	101	628	316	243	68	0	0	0
1997	2844	1101	258	743	101	641	322	251	68	0	0	0
1998	2914	1126	264	761	101	662	327	266	68	0	0	0
1999	2996	1160	270	790	101	675	333	274	68	0	0	0
2000	3071	1192	273	818	101	688	339	281	68	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

LOS ANGELES

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1038	475	327	55	94	87	32	5	50	0	0	0
1971	1035	471	323	49	100	92	33	5	54	0	0	0
1972	1024	472	291	49	132	79	32	4	44	0	0	0
1973	1050	489	308	61	120	73	32	4	36	0	0	0
1974	1021	473	288	70	114	75	32	5	38	0	0	0
1975	1036	478	305	78	95	80	38	7	36	0	0	0
1976	1087	502	320	84	98	84	40	8	36	0	0	0
1977	1142	527	338	90	99	88	43	9	36	0	0	0
1978	1198	554	358	98	99	90	44	10	36	0	0	0
1979	1241	575	371	105	99	92	45	10	36	0	0	0
1980	1266	586	377	110	99	93	46	10	36	0	0	0
1981	1311	608	384	125	99	96	48	12	36	0	0	0
1982	1370	636	397	140	99	99	49	14	36	0	0	0
1983	1415	657	403	155	99	101	50	14	36	0	0	0
1984	1460	679	410	170	99	103	51	15	36	0	0	0
1985	1613	747	435	203	110	119	58	21	40	0	0	0
1986	1662	770	442	219	110	121	59	22	40	0	0	0
1987	1760	818	462	246	110	125	62	23	40	0	0	0
1988	1819	846	469	267	110	127	63	24	40	0	0	0
1989	1917	894	490	294	110	130	65	25	40	0	0	0
1990	2002	934	503	321	110	133	68	26	40	0	0	0
1991	2065	964	517	338	110	137	69	28	40	0	0	0
1992	2108	984	524	351	110	139	70	29	40	0	0	0
1993	2164	1011	537	365	110	142	72	30	40	0	0	0
1994	2228	1041	551	381	110	145	74	32	40	0	0	0
1995	2284	1068	564	394	110	148	76	33	40	0	0	0
1996	2333	1091	571	410	110	150	77	34	40	0	0	0
1997	2395	1121	585	427	110	153	78	35	40	0	0	0
1998	2447	1145	598	437	110	156	80	37	40	0	0	0
1999	2509	1175	612	454	110	158	81	38	40	0	0	0
2000	2557	1198	619	470	110	161	82	39	40	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

KANSAS CITY

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	990	376	227	83	66	237	133	31	74	0	0	0
1971	1024	378	209	106	64	268	156	38	73	0	0	0
1972	954	361	179	107	75	232	137	35	60	0	0	0
1973	978	373	178	131	64	233	135	41	56	0	0	0
1974	1000	381	174	148	58	238	137	46	54	0	0	0
1975	1085	419	192	166	62	246	145	54	47	0	0	0
1976	1143	444	205	176	63	256	150	60	46	0	0	0
1977	1198	466	216	186	64	266	154	67	46	0	0	0
1978	1264	494	228	201	64	277	158	73	46	0	0	0
1979	1322	518	237	217	64	287	163	79	46	0	0	0
1980	1356	532	241	227	64	292	167	79	46	0	0	0
1981	1442	567	245	258	64	308	172	91	46	0	0	0
1982	1537	606	253	289	64	325	176	103	46	0	0	0
1983	1618	642	257	320	64	335	180	109	46	0	0	0
1984	1699	677	261	351	64	346	185	115	46	0	0	0
1985	1805	723	275	383	66	358	189	126	43	0	0	0
1986	1885	758	280	413	66	369	194	132	43	0	0	0
1987	2028	822	292	464	66	384	202	139	43	0	0	0
1988	2129	867	297	505	66	395	207	145	43	0	0	0
1989	2268	931	310	556	66	405	211	151	43	0	0	0
1990	2402	991	318	607	66	420	220	158	43	0	0	0
1991	2497	1030	327	638	66	437	224	170	43	0	0	0
1992	2568	1060	331	663	66	448	229	176	43	0	0	0
1993	2646	1094	340	689	66	459	233	183	43	0	0	0
1994	2740	1133	348	719	66	474	242	189	43	0	0	0
1995	2819	1167	357	745	66	485	246	195	43	0	0	0
1996	2899	1202	361	775	66	495	251	202	43	0	0	0
1997	2988	1241	370	806	66	506	255	208	43	0	0	0
1998	3063	1270	378	826	66	523	260	221	43	0	0	0
1999	3153	1309	387	857	66	534	264	227	43	0	0	0
2000	3233	1344	391	887	66	544	268	233	43	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

JACKSONVILLE

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	992	312	114	56	142	369	237	40	93	0	0	0
1971	1000	304	116	58	130	393	266	44	82	0	0	0
1972	1105	345	103	97	155	415	282	52	81	0	0	0
1973	1080	336	100	92	145	407	290	60	57	0	0	0
1974	1063	327	94	103	131	409	297	61	51	0	0	0
1975	1189	373	110	136	127	442	294	81	68	0	0	0
1976	1236	389	115	145	130	458	299	91	68	0	0	0
1977	1289	406	120	154	132	478	310	100	68	0	0	0
1978	1347	425	127	167	132	496	319	109	68	0	0	0
1979	1399	443	131	180	132	514	327	118	68	0	0	0
1980	1430	454	133	188	132	522	336	118	68	0	0	0
1981	1513	482	136	214	132	550	345	137	68	0	0	0
1982	1601	512	140	240	132	577	354	155	68	0	0	0
1983	1674	540	143	265	132	595	363	164	68	0	0	0
1984	1748	568	145	291	132	612	372	173	68	0	0	0
1985	1892	621	147	330	144	650	387	192	71	0	0	0
1986	1968	650	150	356	144	669	396	202	71	0	0	0
1987	2098	701	156	400	144	696	414	211	71	0	0	0
1988	2191	738	159	436	144	715	423	221	71	0	0	0
1989	2312	789	166	480	144	733	432	230	71	0	0	0
1990	2437	838	170	524	144	761	450	240	71	0	0	0
1991	2527	869	175	550	144	789	459	259	71	0	0	0
1992	2594	893	177	572	144	808	468	269	71	0	0	0
1993	2666	920	182	594	144	826	477	278	71	0	0	0
1994	2755	951	186	620	144	854	495	288	71	0	0	0
1995	2827	977	191	642	144	873	504	298	71	0	0	0
1996	2903	1006	193	669	144	891	513	307	71	0	0	0
1997	2984	1037	198	695	144	910	522	317	71	0	0	0
1998	3056	1059	202	713	144	938	531	336	71	0	0	0
1999	3137	1090	207	739	144	957	540	346	71	0	0	0
2000	3213	1119	209	766	144	975	549	355	71	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY **(Continued)**

INDIANAPOLIS

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1122	369	218	113	39	384	268	66	49	0	0	0
1971	1110	365	202	126	38	379	264	68	47	0	0	0
1972	1156	380	187	152	41	396	269	76	51	0	0	0
1973	1271	428	195	191	42	415	276	91	47	0	0	0
1974	1264	426	175	211	39	412	270	103	40	0	0	0
1975	1359	459	192	232	35	442	287	114	40	0	0	0
1976	1412	474	195	245	34	464	298	126	40	0	0	0
1977	1475	495	203	257	34	486	308	138	40	0	0	0
1978	1563	528	215	279	34	507	317	150	40	0	0	0
1979	1642	557	222	300	34	528	326	163	40	0	0	0
1980	1688	575	226	315	34	537	334	163	40	0	0	0
1981	1815	622	230	358	34	571	343	188	40	0	0	0
1982	1950	673	238	400	34	605	352	213	40	0	0	0
1983	2065	720	242	443	34	626	361	225	40	0	0	0
1984	2180	766	246	486	34	647	370	238	40	0	0	0
1985	2210	775	230	514	30	661	391	230	40	0	0	0
1986	2320	819	234	555	30	682	400	242	40	0	0	0
1987	2508	899	245	623	30	711	419	253	40	0	0	0
1988	2646	957	248	678	30	732	428	265	40	0	0	0
1989	2825	1036	259	747	30	752	437	276	40	0	0	0
1990	3006	1112	266	815	30	782	455	288	40	0	0	0
1991	3135	1160	274	856	30	814	464	311	40	0	0	0
1992	3231	1198	277	891	30	835	473	322	40	0	0	0
1993	3335	1240	284	925	30	855	482	334	40	0	0	0
1994	3461	1288	292	966	30	885	501	345	40	0	0	0
1995	3564	1329	299	1000	30	906	510	357	40	0	0	0
1996	3674	1374	302	1041	30	926	519	368	40	0	0	0
1997	3792	1422	310	1082	30	947	528	380	40	0	0	0
1998	3893	1457	317	1110	30	979	537	403	40	0	0	0
1999	4010	1505	324	1151	30	1000	546	414	40	0	0	0
2000	4120	1550	328	1192	30	1020	555	426	40	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9
IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

GREAT FALLS

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	185	61	42	6	13	62	42	2	18	0	0	0
1971	167	51	25	10	16	64	40	4	20	0	0	0
1972	202	64	31	13	20	75	45	4	26	0	0	0
1973	175	61	26	15	20	53	32	5	17	0	0	0
1974	191	66	32	15	19	60	35	5	20	0	0	0
1975	206	67	31	20	16	72	46	6	20	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

CHICAGO

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1718	737	541	162	35	244	170	33	41	0	0	0
1971	1663	714	483	197	34	236	161	34	40	0	0	0
1972	1595	690	446	219	24	216	140	37	39	0	0	0
1973	1603	701	419	262	19	202	117	51	34	0	0	0
1974	1660	728	420	289	19	204	116	59	29	0	0	0
1975	1808	786	434	332	20	235	150	55	31	0	0	0
1976	1860	807	440	348	19	245	155	60	30	0	0	0
1977	1905	825	442	364	18	256	161	65	30	0	0	0
1978	2028	881	468	395	18	267	165	71	30	0	0	0
1979	2133	928	485	425	18	277	170	77	30	0	0	0
1980	2195	957	493	445	18	282	174	77	30	0	0	0
1981	2350	1026	502	506	18	298	179	89	30	0	0	0
1982	2522	1104	519	567	18	315	184	101	30	0	0	0
1983	2671	1173	527	627	18	325	188	107	30	0	0	0
1984	2820	1242	536	688	18	336	193	113	30	0	0	0
1985	2735	1185	496	675	14	364	219	116	29	0	0	0
1986	2869	1247	504	729	14	375	224	122	29	0	0	0
1987	3112	1360	527	819	14	391	235	128	29	0	0	0
1988	3282	1440	535	891	14	402	240	133	29	0	0	0
1989	3519	1553	559	991	14	413	245	139	29	0	0	0
1990	3746	1659	574	1071	14	429	255	145	29	0	0	0
1991	3902	1728	589	1125	14	445	260	157	29	0	0	0
1992	4019	1781	597	1170	14	456	265	162	29	0	0	0
1993	4150	1842	612	1215	14	467	270	168	29	0	0	0
1994	4305	1911	628	1269	14	483	281	174	29	0	0	0
1995	4437	1972	643	1314	14	494	286	180	29	0	0	0
1996	4572	2033	651	1368	14	505	291	186	29	0	0	0
1997	4722	2103	667	1422	14	516	296	191	29	0	0	0
1998	4841	2154	682	1458	14	533	301	203	29	0	0	0
1999	4991	2224	698	1512	14	543	306	209	29	0	0	0
2000	5126	2284	705	1566	14	554	311	215	29	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

CLEVELAND

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1603	565	374	178	13	474	362	60	52	0	0	0
1971	1494	507	319	174	14	479	369	62	48	0	0	0
1972	1550	539	329	195	16	472	353	68	50	0	0	0
1973	1665	599	343	238	19	466	346	76	44	0	0	0
1974	1645	601	326	257	18	443	320	84	39	0	0	0
1975	1767	644	334	298	13	479	343	99	37	0	0	0
1976	1827	670	345	313	12	488	343	108	37	0	0	0
1977	1894	698	359	328	11	499	346	116	37	0	0	0
1978	2010	746	390	355	11	519	356	126	37	0	0	0
1979	2113	787	393	382	11	539	366	137	37	0	0	0
1980	2173	812	400	400	11	549	376	137	37	0	0	0
1981	2327	873	407	455	11	580	386	158	37	0	0	0
1982	2494	942	421	510	11	611	396	179	37	0	0	0
1983	2638	1003	428	564	11	631	405	189	37	0	0	0
1984	2781	1065	435	619	11	652	415	200	37	0	0	0
1985	2713	1067	429	630	8	579	366	180	34	0	0	0
1986	2844	1124	436	680	8	597	374	189	34	0	0	0
1987	3079	1229	456	764	8	623	391	198	34	0	0	0
1988	3244	1302	462	832	8	640	400	207	34	0	0	0
1989	3470	1406	482	916	8	658	408	216	34	0	0	0
1990	3690	1503	496	1000	8	684	425	225	34	0	0	0
1991	3844	1567	509	1050	8	710	434	243	34	0	0	0
1992	3959	1616	516	1092	8	728	442	252	34	0	0	0
1993	4088	1671	529	1134	8	745	451	261	34	0	0	0
1994	4241	1735	543	1184	8	771	468	270	34	0	0	0
1995	4370	1791	556	1226	8	789	476	279	34	0	0	0
1996	4501	1848	563	1277	8	806	485	288	34	0	0	0
1997	4646	1911	576	1327	8	824	493	297	34	0	0	0
1998	4767	1958	590	1361	8	850	502	315	34	0	0	0
1999	4912	2022	603	1411	8	868	510	324	34	0	0	0
2000	5044	2079	610	1462	8	885	519	333	34	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

DENVER

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	617	166	120	23	24	284	219	10	56	0	0	0
1971	612	166	118	24	24	281	216	10	55	0	0	0
1972	595	167	112	31	24	260	201	10	49	0	0	0
1973	631	190	121	40	28	252	201	12	39	0	0	0
1974	634	193	122	43	28	249	191	14	44	0	0	0
1975	642	194	120	52	21	254	201	16	37	0	0	0
1976	667	204	127	57	20	259	204	18	37	0	0	0
1977	699	217	135	62	20	266	210	20	36	0	0	0
1978	733	230	143	67	20	274	216	22	36	0	0	0
1979	761	240	148	72	20	282	222	23	36	0	0	0
1980	779	246	151	75	20	288	228	23	36	0	0	0
1981	815	259	153	86	20	297	234	27	36	0	0	0
1982	855	274	159	96	20	307	240	31	36	0	0	0
1983	889	287	161	106	20	315	246	32	36	0	0	0
1984	922	300	164	116	20	323	252	34	36	0	0	0
1985	976	325	173	135	18	325	249	42	34	0	0	0
1986	1011	339	176	146	18	333	255	44	34	0	0	0
1987	1077	365	184	164	18	347	267	46	34	0	0	0
1988	1119	382	186	178	18	354	273	48	34	0	0	0
1989	1179	408	194	196	18	362	278	50	34	0	0	0
1990	1239	432	200	214	18	376	290	53	34	0	0	0
1991	1282	448	205	225	18	386	296	57	34	0	0	0
1992	1313	460	208	234	18	394	302	59	34	0	0	0
1993	1350	474	213	243	18	402	307	61	34	0	0	0
1994	1396	490	219	254	18	416	319	63	34	0	0	0
1995	1432	505	224	263	18	423	325	65	34	0	0	0
1996	1467	518	227	274	18	431	331	67	34	0	0	0
1997	1508	534	232	284	18	439	336	69	34	0	0	0
1998	1543	547	238	292	18	449	342	74	34	0	0	0
1999	1583	563	243	302	18	457	349	76	34	0	0	0
2000	1618	577	246	313	18	465	354	78	34	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

FORT WORTH

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1194	498	249	76	174	197	82	22	92	0	0	0
1971	1167	466	229	73	165	234	83	23	128	0	0	0
1972	1186	477	212	104	161	232	80	27	125	0	0	0
1973	1192	487	218	114	155	219	83	31	104	0	0	0
1974	1242	513	243	127	143	217	83	36	98	0	0	0
1975	1314	538	225	163	151	237	96	41	100	0	0	0
1976	1376	564	238	174	152	249	102	46	101	0	0	0
1977	1430	586	247	186	153	259	107	51	101	0	0	0
1978	1497	615	261	201	153	267	110	56	101	0	0	0
1979	1555	640	271	217	153	275	113	60	101	0	0	0
1980	1588	655	276	227	153	278	116	60	101	0	0	0
1981	1672	691	280	258	153	290	119	70	101	0	0	0
1982	1765	732	290	289	153	302	122	79	101	0	0	0
1983	1844	767	295	320	153	310	125	84	101	0	0	0
1984	1924	803	299	351	153	318	128	88	101	0	0	0
1985	2097	875	310	405	159	347	140	102	106	0	0	0
1986	2179	912	315	437	159	356	143	107	106	0	0	0
1987	2328	980	330	491	159	367	150	112	106	0	0	0
1988	2433	1029	335	535	159	376	153	117	106	0	0	0
1989	2578	1097	349	589	159	384	156	122	106	0	0	0
1990	2717	1161	359	643	159	396	163	128	106	0	0	0
1991	2815	1203	369	675	159	409	166	138	106	0	0	0
1992	2887	1235	373	702	159	417	169	143	106	0	0	0
1993	2968	1271	383	729	159	426	172	148	106	0	0	0
1994	3064	1313	393	761	159	437	179	153	106	0	0	0
1995	3146	1350	403	788	159	446	182	158	106	0	0	0
1996	3229	1387	407	821	159	454	185	163	106	0	0	0
1997	3321	1430	417	853	159	462	189	168	106	0	0	0
1998	3397	1461	427	875	159	476	192	179	106	0	0	0
1999	3490	1503	437	907	159	484	195	184	106	0	0	0
2000	3573	1540	441	940	159	493	198	189	106	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

ATLANTA

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1167	474	318	89	67	219	102	37	80	0	0	0
1971	1170	473	313	94	65	224	104	39	82	0	0	0
1972	1264	504	324	114	65	255	110	45	100	0	0	0
1973	1363	556	345	148	64	251	110	55	86	0	0	0
1974	1410	579	347	174	59	251	111	58	82	0	0	0
1975	1435	589	348	181	60	257	117	69	71	0	0	0
1976	1508	618	364	193	62	272	124	78	71	0	0	0
1977	1589	652	383	206	63	285	128	86	71	0	0	0
1978	1679	691	405	223	63	297	132	94	71	0	0	0
1979	1754	723	420	240	63	308	136	101	71	0	0	0
1980	1795	742	427	252	63	312	139	101	71	0	0	0
1981	1898	783	434	286	63	331	143	117	71	0	0	0
1982	2015	832	449	320	63	350	147	133	71	0	0	0
1983	2110	874	456	355	63	362	150	140	71	0	0	0
1984	2205	916	464	389	63	373	154	148	71	0	0	0
1985	2411	1009	493	450	66	392	161	160	71	0	0	0
1986	2510	1053	501	486	66	404	165	168	71	0	0	0
1987	2691	1136	524	546	66	419	173	176	71	0	0	0
1988	2815	1192	531	594	66	431	176	184	71	0	0	0
1989	2993	1275	554	654	66	443	180	192	71	0	0	0
1990	3159	1350	570	714	66	458	188	200	71	0	0	0
1991	3281	1402	585	750	66	478	191	216	71	0	0	0
1992	3369	1439	593	780	66	490	195	224	71	0	0	0
1993	3471	1485	608	810	66	502	199	232	71	0	0	0
1994	3589	1536	624	846	66	517	206	240	71	0	0	0
1995	3692	1582	639	876	66	529	210	248	71	0	0	0
1996	3791	1625	647	912	66	541	214	256	71	0	0	0
1997	3906	1677	662	948	66	552	218	264	71	0	0	0
1998	4004	1716	678	972	66	572	221	280	71	0	0	0
1999	4119	1767	693	1008	66	584	225	288	71	0	0	0
2000	4218	1811	701	1044	66	596	229	296	71	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

BOSTON

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	1036	414	258	92	65	208	137	17	54	0	0	0
1971	1016	403	242	96	66	211	135	20	55	0	0	0
1972	933	374	202	109	63	184	115	20	50	0	0	0
1973	949	379	196	122	60	192	120	14	57	0	0	0
1974	914	363	181	129	53	189	120	15	54	0	0	0
1975	960	390	174	168	48	179	112	31	36	0	0	0
1976	995	405	179	178	47	186	116	35	36	0	0	0
1977	1033	422	186	188	47	190	117	38	35	0	0	0
1978	1093	448	197	204	47	197	120	42	35	0	0	0
1979	1145	471	204	219	47	204	123	45	35	0	0	0
1980	1177	485	208	230	47	207	127	45	35	0	0	0
1981	1257	520	212	261	47	217	130	52	35	0	0	0
1982	1344	558	219	292	47	228	133	59	35	0	0	0
1983	1421	593	222	324	47	234	137	63	35	0	0	0
1984	1497	628	226	355	47	241	140	66	35	0	0	0
1985	1492	628	207	383	38	236	129	74	33	0	0	0
1986	1566	662	210	413	38	243	132	78	33	0	0	0
1987	1697	723	220	464	38	252	138	81	33	0	0	0
1988	1792	767	223	505	38	259	141	85	33	0	0	0
1989	1920	827	233	556	38	266	144	89	33	0	0	0
1990	2045	885	239	607	38	276	150	93	33	0	0	0
1991	2130	922	246	638	38	286	153	100	33	0	0	0
1992	2194	951	249	663	38	293	156	104	33	0	0	0
1993	2264	983	256	689	38	299	159	107	33	0	0	0
1994	2348	1020	262	719	38	309	165	111	33	0	0	0
1995	2419	1052	269	745	38	316	168	115	33	0	0	0
1996	2493	1085	272	775	38	322	171	118	33	0	0	0
1997	2574	1122	278	806	38	329	174	122	33	0	0	0
1998	2638	1149	285	826	38	340	177	130	33	0	0	0
1999	2719	1186	291	857	38	346	180	133	33	0	0	0
2000	2793	1220	294	887	38	353	183	137	33	0	0	0

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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

ALBUQUERQUE

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	700	258	110	23	125	185	108	11	66	0	0	0
1971	727	262	104	24	134	204	116	11	77	0	0	0
1972	699	241	98	25	118	217	103	12	102	0	0	0
1973	817	304	108	32	163	210	111	13	86	0	0	0
1974	863	313	108	33	172	236	110	14	111	0	0	0
1975	1016	386	105	42	240	243	120	18	105	0	0	0
1976	1025	386	110	45	232	252	126	20	106	0	0	0
1977	1045	393	117	48	228	260	131	22	107	0	0	0
1978	1073	404	124	52	228	266	134	24	107	0	0	0
1979	1095	412	128	56	228	271	138	26	107	0	0	0
1980	1109	417	131	59	228	275	142	26	107	0	0	0
1981	1137	427	133	67	228	283	145	30	107	0	0	0
1982	1170	440	137	75	228	290	149	34	107	0	0	0
1983	1196	450	140	83	228	296	153	36	107	0	0	0
1984	1223	460	142	91	228	302	157	38	107	0	0	0
1985	1288	484	147	113	224	321	166	40	116	0	0	0
1986	1317	495	150	122	224	327	169	42	116	0	0	0
1987	1370	517	156	137	224	337	177	44	116	0	0	0
1988	1405	531	159	149	224	342	181	46	116	0	0	0
1989	1455	553	166	164	224	348	185	48	116	0	0	0
1990	1503	573	170	179	224	358	193	50	116	0	0	0
1991	1538	586	175	188	224	366	196	54	116	0	0	0
1992	1564	596	177	195	224	372	200	56	116	0	0	0
1993	1594	608	182	203	224	378	204	58	116	0	0	0
1994	1631	622	186	212	224	387	212	60	116	0	0	0
1995	1661	634	191	219	224	393	216	62	116	0	0	0
1996	1689	645	193	228	224	399	219	64	116	0	0	0
1997	1722	659	198	237	224	405	223	66	116	0	0	0
1998	1751	669	202	243	224	413	227	70	116	0	0	0
1999	1785	683	207	252	224	419	231	72	116	0	0	0
2000	1813	694	209	261	224	424	235	74	116	0	0	0

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

Table 9

IFR AIRCRAFT HANDLED BY USER CATEGORY (Continued)

NATIONAL REPORT

FISCAL YEAR	AIRCRAFT HANDLED	DEPARTURES				OVERS						
							DOMESTIC			OCEANIC		
		TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	TOTAL	AIR CARRIER	GENERAL AVIATION	MILITARY	AIR CARRIER	GENERAL AVIATION	MILITARY
1970	21606	8362	5242	1542	1578	4882	2622	463	1140	443	25	190
1971	21327	8153	4912	1644	1597	5021	2698	489	1205	433	26	170
1972	22023	8455	4631	2061	1764	5113	2703	540	1228	449	47	147
1973	22842	8877	4699	2430	1748	5088	2758	621	1061	449	50	150
1974	22883	8963	4637	2711	1615	4957	2702	680	1002	424	50	98
1975	24500	9600	4800	3200	1600	5300	2833	822	986	467	78	114
1976	25502	10001	5001	3400	1600	5500	2917	912	986	483	88	114
1977	26501	10401	5201	3600	1600	5699	3004	1002	987	495	98	113
1978	27901	11001	5501	3900	1600	5899	3090	1093	987	509	107	113
1979	29101	11501	5701	4200	1600	6099	3176	1185	987	524	116	113
1980	29801	11601	5801	4400	1600	6199	3262	1185	987	538	116	113
1981	31501	12501	5901	5000	1600	6499	3347	1367	987	552	133	113
1982	33401	13301	6101	5600	1600	6799	3433	1549	987	566	151	113
1983	35001	14001	6201	6200	1600	6999	3519	1640	987	580	160	113
1984	36601	14701	6301	6800	1600	7199	3605	1731	987	594	169	113
1985	38403	15501	6401	7500	1600	7401	3679	1809	996	621	191	105
1986	40003	16201	6501	8100	1600	7601	3764	1899	996	636	201	105
1987	42903	17501	6801	9100	1600	7901	3935	1989	996	665	211	105
1988	44903	18401	6901	9900	1600	8101	4021	2080	996	679	220	105
1989	47703	19701	7201	10900	1600	8301	4106	2170	996	694	230	105
1990	50403	20901	7401	11900	1600	8601	4278	2261	996	723	239	105
1991	52303	21701	7601	12500	1600	8901	4363	2442	996	737	258	105
1992	53703	22301	7701	13000	1600	9101	4449	2532	996	751	268	105
1993	55303	23001	7901	13500	1600	9301	4534	2622	996	766	278	105
1994	57203	23801	8101	14100	1600	9601	4705	2713	996	795	287	105
1995	58803	24501	8301	14600	1600	9801	4791	2803	996	809	297	105
1996	60403	25201	8401	15200	1600	10001	4876	2894	996	824	306	105
1997	62203	26001	8601	15800	1600	10201	4962	2984	996	838	316	105
1998	63703	26601	8801	16200	1600	10501	5047	3165	996	853	335	105
1999	65503	27401	9001	16800	1600	10701	5133	3255	996	867	345	105
2000	67103	28101	9101	17400	1600	10901	5219	3346	996	881	354	105

FIGURES IN THOUSANDS
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NOTE: DETAIL MAY NOT ADD DUE TO INDEPENDENT ROUNDING

TERMINAL AREA FORECAST

1975-2000

The long-term forecasts of terminal area (TA) activity are based on national forecasts in a top down approach. For the year 1988 and beyond, these forecasts were adjusted for the anticipated impact of the UG3RD avionics costs on general aviation. Generally, the percentage reductions in activity at the national level were also assumed to exist at the TA level. Exceptions occurred at facilities which reached capacity during the forecast period. In these cases, reductions in GA activity would not affect the overall level of activity in the year 2000. Note that in all cases, the reductions in activity were less than one-tenth of 1 percent.

It should be noted that the TAF data is not sufficiently sensitive to the various UG3RD implementation scenarios to require alternative forecast projections.

800 TAF's are available on timeshare computer as well as passenger forecasts at the top 60 terminals. Limited number of hard copy are available. A sample of the type of information provided is shown on the following pages. Contact the Aviation Forecast Branch for additional information.

Table 10

Sample Terminal Area Forecast

AIRPORT NAME - LOCATION IDENTIFIER

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
A/C FNP	0	0	0	0	0	0	0	0	0	0	0	0	0
A/T FNP	0	0	0	0	0	0	0	0	0	0	0	0	0
A/C	0	0	0	0	0	0	0	0	0	0	0	0	0
A/T	0	0	0	0	0	0	0	0	0	0	0	0	0
ITN	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0
INST	0	0	0	0	0	0	0	0	0	0	0	0	0
APR	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 10

Sample Terminal Area Forecast (Continued)

AIRPORT NAME - LOCATION IDENTIFIER

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A/C ENP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A/T ENP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A/C	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A/T	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INST	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APP	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL LEVEL

AVIATION FORECAST

1975 - 2000

May 2, 1975

Note:

The following forecasts are provided under alternative UG3RD assumptions to the year 2000. The first set of forecasts assumes the completed introduction of CAS/CAD, DABS into the system by 1988.

The second set of forecasts assumes the completed introduction of MLS into the system also by 1988.

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Our analysis of the effect of implementing either the CAS/CAD, DABS, or MLS alternatives indicate that their cost impact on the level of general aviation, air taxi, and air carrier activity is small, but not necessarily negligible. Specifically, the impact of any of the above systems is to reduce general aviation and air taxi activity levels by less than 1 percent per year as compared to the baseline scenario. Air carrier operations do not change.

Since even such small percentage changes may be meaningful in terms of manpower requirements and terminal area activity, the attached tables provide the magnitude of the revised activity levels under each of the alternative UG3RD systems.

As per the data forwarded to us, our investigation deals only with the incremental investment cost and excludes operating and maintenance costs. The assumed date of equipage is 1988.

Our analysis is based on a model recently developed by Steve Vahovich and Jonathan Tom, which now gives us the capacity to analyze the impact of a wide variety of changes in fixed and variable costs on general aviation activity, fleet size and hours flown.

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Table 11

UNITED STATES CERTIFICATED ROUTE AIR CARRIER
DOMESTIC SCHEDULED PASSENGER TRAFFIC

Fiscal Year	Revenue Passenger-Miles (Billions)	Revenue Passenger Enplanements (Millions)
1975	140.5	200.7
1976	153.1	215.3
1977	166.8	231.0
1978	181.3	247.8
1979	194.9	262.3
1980	208.2	276.1
1981	221.0	288.5
1982	233.2	301.7
1983	246.0	315.0
1984	259.5	328.9
1985	275.8	346.0
1986	285.8	355.0
1987	298.6	369.1
1988	312.1	383.9
1989	326.1	399.1
1990	340.8	415.1
1991	356.2	431.8
1992	372.2	448.4
1993	388.9	466.3
1994	405.3	483.7
1995	422.3	502.1
1996	440.0	520.7
1997	458.5	540.7
1998	477.8	561.5
1999	497.8	588.2
2000	518.7	604.5

Table 12
ESTIMATED TOTAL ITINERANT AND LOCAL AIRCRAFT OPERATIONS
AT AIRPORT WITH FAA TRAFFIC CONTROL SERVICE

(In millions)
CAS/CAD/DABS

Fiscal Year	Total	Itinerant	Local	Number of Towers
1975	61.6	38.1	23.5	427
1976	66.4	40.8	25.6	432
1977	69.4	42.6	26.8	437
1978	72.6	44.6	28.0	442
1979	75.5	46.4	29.1	447
1980	78.6	48.3	30.3	452
1981	86.1	52.0	34.1	457
1982	93.5	55.7	37.8	461
1983	100.9	59.4	41.5	466
1984	107.9	63.1	44.8	471
1985	115.9	66.8	49.1	476
1986	123.4	70.5	52.9	481
1987	130.4	72.9	57.5	486
1988	138.7	76.7	62.0	491
1989	148.5	81.3	67.2	496
1990	158.8	85.9	72.9	500
1991	165.4	89.2	76.2	505
1992	171.9	92.4	79.5	510
1993	178.3	95.5	82.8	515
1994	184.9	98.8	86.1	519
1995	191.3	101.9	89.4	524
1996	198.0	105.2	92.8	529
1997	204.4	108.3	96.1	534
1998	210.9	111.5	99.4	539
1999	217.5	114.8	102.7	544
2000	224.0	118.0	106.0	549

Table 13
ESTIMATED ITINERANT AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

CAS/CAD/DABS

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military
1975	38.1	9.8	2.5	24.4	1.4
1976	40.8	10.3	2.6	26.5	1.4
1977	42.6	10.7	2.7	27.8	1.4
1978	44.6	11.2	2.9	29.1	1.4
1979	46.4	11.6	3.0	30.4	1.4
1980	48.3	12.0	3.1	31.8	1.4
1981	52.0	12.3	3.4	34.9	1.4
1982	55.7	12.6	3.9	37.8	1.4
1983	59.4	12.9	4.2	40.9	1.4
1984	63.1	13.2	4.5	44.0	1.4
1985	66.8	13.5	4.7	47.2	1.4
1986	70.5	13.8	5.0	50.3	1.4
1987	72.9	14.0	5.4	52.0	1.5
1988	76.7	14.3	5.8	55.1	1.5
1989	81.3	14.8	6.2	58.8	1.5
1990	85.9	15.2	6.6	62.6	1.5
1991	89.2	15.6	6.9	65.2	1.5
1992	92.4	16.0	7.1	67.8	1.5
1993	95.5	16.3	7.4	70.3	1.5
1994	98.8	16.7	7.7	72.9	1.5
1995	101.9	17.0	8.0	75.4	1.5
1996	105.2	17.4	8.3	78.0	1.5
1997	108.3	17.8	8.5	80.5	1.5
1998	111.5	18.1	8.8	83.1	1.5
1999	114.8	18.5	9.1	85.6	1.6
2000	118.0	18.8	9.4	88.2	1.6

Table 14

ESTIMATED LOCAL AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)
CAS/CAD/DABS

Fiscal Year	Total	General Aviation	Military
1975	23.5	21.8	1.7
1976	25.6	23.9	1.7
1977	26.8	25.1	1.7
1978	28.0	26.3	1.7
1979	29.1	27.4	1.7
1980	30.3	28.6	1.7
1981	34.1	32.4	1.7
1982	37.8	36.2	1.6
1983	41.5	39.9	1.6
1984	44.8	43.2	1.6
1985	49.1	47.5	1.6
1986	52.9	51.3	1.6
1987	57.5	55.8	1.7
1988	62.0	60.3	1.7
1989	67.2	65.5	1.7
1990	72.9	71.2	1.8
1991	76.2	74.5	1.8
1992	79.5	77.8	1.8
1993	82.8	81.1	1.8
1994	86.1	84.4	1.8
1995	89.4	87.6	1.8
1996	92.8	91.0	1.8
1997	96.1	94.3	1.8
1998	99.4	97.6	1.8
1999	102.7	100.8	1.9
2000	106.0	104.1	1.9

Table 15

ESTIMATED INSTRUMENT OPERATIONS AT AIRPORTS
WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

CAS/CAD/DABS

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military	Number TCA's
1975	26.2	9.8	1.5	10.7	4.2	23
1976	27.6	10.3	1.6	11.5	4.2	23
1977	28.7	10.7	1.7	12.1	4.2	23
1978	32.1	11.2	1.9	14.8	4.2	23
1979	35.4	11.6	2.0	17.6	4.2	23
1980	37.6	12.0	2.1	19.3	4.2	23
1981	40.3	12.3	2.4	21.4	4.2	23
1982	43.0	12.6	2.6	23.6	4.2	23
1983	46.1	12.9	2.8	26.2	4.2	23
1984	48.8	13.2	3.0	28.4	4.2	23
1985	51.5	13.5	3.4	30.4	4.2	23
1986	54.2	13.8	3.6	32.6	4.2	23
1987	56.6	14.0	3.8	34.6	4.2	23
1988	59.2	14.3	4.1	36.6	4.2	23
1989	61.9	14.8	4.4	38.5	4.2	23
1990	64.7	15.2	4.8	40.5	4.2	23
1991	67.2	15.6	5.0	42.4	4.2	23
1992	69.8	16.0	5.2	44.4	4.2	23
1993	72.2	16.3	5.4	46.3	4.2	23
1994	74.8	16.7	5.6	48.3	4.2	23
1995	77.3	17.0	5.9	50.2	4.2	23
1996	79.9	17.4	6.1	52.2	4.2	23
1997	82.4	17.8	6.3	54.1	4.2	23
1998	84.9	18.1	6.5	56.1	4.2	23
1999	87.4	18.5	6.7	58.0	4.2	23
2000	90.0	18.8	7.0	60.0	4.2	23

Table 16

ESTIMATED IFR AIRCRAFT HANDLED, IFR DEPARTURES, AND OVERS BY USER CATEGORY
FAA AIR ROUTE TRAFFIC CONTROL CENTERS
(In millions)
CAS/CAD/DABS

Fiscal Year	Total			Air Carrier			Air Taxi			General Aviation			Military		
	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs
1975	24.5	9.6	5.3	12.9	4.8	3.3	1.1	.5	.1	6.2	2.7	.8	4.3	1.6	1.1
1976	25.5	10.0	5.5	13.4	5.0	3.4	1.3	.6	.1	6.5	2.8	.9	4.3	1.6	1.1
1977	26.5	10.4	5.7	13.9	5.2	3.5	1.3	.6	.1	7.0	3.0	1.0	4.3	1.6	1.1
1978	27.9	11.0	5.9	14.6	5.5	3.6	1.5	.7	.1	7.5	3.2	1.1	4.3	1.6	1.1
1979	29.1	11.5	6.1	15.1	5.7	3.7	1.7	.8	.1	8.0	3.4	1.2	4.3	1.6	1.1
1980	29.8	11.8	6.2	15.4	5.8	3.8	1.7	.8	.1	8.4	3.6	1.2	4.3	1.6	1.1
1981	31.5	12.5	6.5	15.7	5.9	3.9	2.1	1.0	.1	9.4	4.0	1.4	4.3	1.6	1.1
1982	33.4	13.3	6.8	16.2	6.1	4.0	2.3	1.1	.1	10.6	4.5	1.6	4.3	1.6	1.1
1983	35.0	14.0	7.0	16.5	6.2	4.1	2.5	1.2	.1	11.7	5.0	1.7	4.3	1.6	1.1
1984	36.6	14.7	7.2	16.8	6.3	4.2	2.7	1.3	.1	12.8	5.5	1.8	4.3	1.6	1.1
1985	38.4	15.5	7.4	17.1	6.4	4.3	3.1	1.5	.1	13.9	6.0	1.9	4.3	1.6	1.1
1986	40.0	16.2	7.6	17.4	6.5	4.4	3.3	1.6	.1	15.0	6.5	2.0	4.3	1.6	1.1
1987	42.9	17.5	7.9	18.2	6.8	4.6	3.7	1.8	.1	16.7	7.3	2.1	4.3	1.6	1.1
1988	45.1	18.5	8.1	18.7	7.0	4.7	3.9	1.9	.1	18.2	8.0	2.2	4.3	1.6	1.1
1989	47.7	19.7	8.3	19.2	7.2	4.8	4.3	2.1	.1	19.9	8.8	2.3	4.3	1.6	1.1
1990	50.4	20.9	8.6	19.8	7.4	5.0	4.5	2.2	.1	21.8	9.7	2.4	4.3	1.6	1.1
1991	52.3	21.7	8.9	20.3	7.6	5.1	4.8	2.3	.2	22.9	10.2	2.5	4.3	1.6	1.1
1992	53.7	22.3	9.1	20.6	7.7	5.2	5.0	2.4	.2	23.8	10.6	2.6	4.3	1.6	1.1
1993	55.3	23.0	9.3	21.1	7.9	5.3	5.0	2.4	.2	24.9	11.1	2.7	4.3	1.6	1.1
1994	57.2	23.8	9.6	21.7	8.1	5.5	5.2	2.5	.2	26.0	11.6	2.8	4.3	1.6	1.1
1995	58.8	24.5	9.8	22.2	8.3	5.6	5.4	2.6	.2	26.9	12.0	2.9	4.3	1.6	1.1
1996	60.4	25.2	10.0	22.5	8.4	5.7	5.6	2.7	.2	28.0	12.5	3.0	4.3	1.6	1.1
1997	62.2	26.0	10.2	23.0	8.6	5.8	5.8	2.8	.2	29.1	13.0	3.1	4.3	1.6	1.1
1998	63.7	26.6	10.5	23.6	8.8	5.9	5.8	2.8	.2	30.1	13.4	3.3	4.3	1.6	1.1
1999	65.5	27.4	10.7	24.0	9.0	6.0	6.0	2.9	.2	31.2	13.9	3.4	4.3	1.6	1.1
2000	67.1	28.1	10.9	24.3	9.1	6.1	6.2	3.0	.2	32.3	14.4	3.5	4.3	1.6	1.1

Table 17

TOTAL FLIGHT SERVICES, PILOT BRIEFS
AND FLIGHT PLANS ORIGINATED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/TOWERS

(In millions)

CAS/CAD/DABS

Fiscal Year	Total Flight Services	Pilot Briefs	Flight Plans Originated		
			Total	IFR-DVER	VFR
1975	62.7	17.5	8.4	5.4	3.0
1976	69.2	19.6	9.3	6.1	3.2
1977	75.8	21.8	10.1	6.8	3.3
1978	80.9	23.5	10.7	7.3	3.4
1979	87.7	25.9	11.4	7.9	3.5
1980	95.6	28.7	12.3	8.6	3.7
1981	106.5	32.3	13.6	9.7	3.9
1982	117.5	35.8	15.0	10.9	4.1
1983	128.7	39.4	16.4	12.0	4.4
1984	139.7	42.9	17.8	13.2	4.6
1985	150.9	46.5	19.2	14.3	4.9
1986	162.1	50.1	20.6	15.4	5.2
1987	179.4	56.2	22.6	17.3	5.3
1988	196.9	62.3	24.5	19.0	5.5
1989	216.1	69.7	26.7	20.9	5.8
1990	237.3	76.0	29.1	23.0	6.1
1991	249.0	79.9	30.5	24.2	6.3
1992	260.4	83.8	31.8	25.3	6.5
1993	272.2	87.7	33.2	26.5	6.7
1994	283.7	91.6	34.6	27.7	6.9
1995	295.5	95.5	36.0	28.9	7.1
1996	307.0	99.4	37.3	30.0	7.3
1997	317.9	103.3	38.7	31.2	7.5
1998	330.6	107.2	40.2	32.4	7.8
1999	342.4	111.2	41.6	33.6	8.0
2000	353.9	115.1	42.9	34.7	8.2

Table 18

AIRCRAFT CONTACTED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/ TOWERS

(In millions)
CAS/CAD/DABS

Fiscal Year	Total	IFR-DVFR	VFR	Air Carrier	Air Taxi	General Aviation	Military
1975	10.9	2.1	8.8	.3	.8	9.1	.7
1976	11.4	2.4	9.0	.3	.8	9.6	.7
1977	12.0	2.7	9.3	.3	.9	10.1	.7
1978	12.5	3.0	9.5	.3	1.0	10.6	.7
1979	13.1	3.3	9.8	.3	1.0	11.1	.7
1980	13.6	3.6	10.0	.3	1.1	11.5	.7
1981	14.7	4.1	10.6	.3	1.2	12.5	.7
1982	15.9	4.6	11.3	.3	1.3	13.6	.7
1983	17.1	5.1	12.0	.3	1.4	14.7	.7
1984	18.3	5.6	12.7	.3	1.5	15.8	.7
1985	19.5	6.2	13.3	.3	1.6	16.9	.7
1986	20.7	6.8	13.9	.3	1.8	17.9	.7
1987	21.8	7.8	14.0	.3	1.9	18.9	.7
1988	23.3	8.8	14.5	.3	2.1	20.2	.7
1989	25.3	10.2	15.1	.3	2.2	22.1	.7
1990	27.1	11.4	15.7	.3	2.4	23.7	.7
1991	28.2	12.0	16.2	.3	2.5	24.7	.7
1992	29.2	12.6	16.6	.3	2.6	25.6	.7
1993	30.4	13.3	17.1	.3	2.7	26.7	.7
1994	31.3	13.8	17.5	.3	2.8	27.5	.7
1995	32.5	14.5	18.0	.3	2.9	28.5	.7
1996	33.6	15.1	18.5	.3	3.0	29.6	.7
1997	33.9	15.7	18.2	.3	3.1	29.8	.7
1998	35.8	16.4	19.4	.3	3.3	31.5	.7
1999	36.8	17.0	19.8	.3	3.4	32.4	.7
2000	37.9	17.6	20.3	.3	3.5	33.4	.7

MLS AVIATION FORECAST

1975 - 2000

UG3RD EVALUATION

MAY 2, 1975

AVP-120

Table 19

UNITED STATES CERTIFICATED ROUTE AIR CARRIER
DOMESTIC SCHEDULED PASSENGER TRAFFIC

Fiscal Year	Revenue Passenger-Miles (Billions)	Revenue Passenger Enplanements (Millions)
1975	140.5	200.7
1976	153.1	215.3
1977	166.8	231.0
1978	181.3	247.8
1979	194.9	262.3
1980	208.2	276.1
1981	221.0	288.5
1982	233.2	301.7
1983	246.0	315.0
1984	259.5	328.9
1985	275.8	346.0
1986	285.8	355.0
1987	298.6	369.1
1988	312.1	383.9
1989	326.1	399.1
1990	340.8	415.1
1991	356.2	431.8
1992	372.2	448.4
1993	388.9	466.3
1994	405.3	483.7
1995	422.3	502.1
1996	440.0	520.7
1997	458.5	540.7
1998	477.8	561.5
1999	497.8	588.2
2000	518.7	604.5

Table 20
ESTIMATED TOTAL ITINERANT AND LOCAL AIRCRAFT OPERATIONS
AT AIRPORT WITH FAA TRAFFIC CONTROL SERVICE
(In millions)
CAS/CAD/DABS

Fiscal Year	Total	Itinerant	Local	Number of Towers
1975	61.6	38.1	23.5	427
1976	66.4	40.8	25.6	432
1977	69.4	42.6	26.8	437
1978	72.6	44.6	28.0	442
1979	75.5	46.4	29.1	447
1980	78.6	48.3	30.3	452
1981	86.1	52.0	34.1	457
1982	93.5	55.7	37.8	461
1983	100.9	59.4	41.5	466
1984	107.9	63.1	44.8	471
1985	115.9	66.8	49.1	476
1986	123.4	70.5	52.9	481
1987	130.4	72.9	57.5	486
1988	138.7	76.7	62.0	491
1989	148.5	81.3	67.2	496
1990	158.8	85.9	72.9	500
1991	165.4	89.2	76.2	505
1992	171.9	92.4	79.5	510
1993	178.3	95.5	82.8	515
1994	184.9	98.8	86.1	519
1995	191.3	101.9	89.4	524
1996	198.0	105.2	92.8	529
1997	204.4	108.3	96.1	534
1998	210.9	111.5	99.4	539
1999	217.5	114.8	102.7	544
2000	224.0	118.0	106.0	549

Table 21
ESTIMATED ITINERANT AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

CAS/CAD/DABS

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military
1975	38.1	9.8	2.5	24.4	1.4
1976	40.8	10.3	2.6	26.5	1.4
1977	42.6	10.7	2.7	27.8	1.4
1978	44.6	11.2	2.9	29.1	1.4
1979	46.4	11.6	3.0	30.4	1.4
1980	48.3	12.0	3.1	31.8	1.4
1981	52.0	12.3	3.4	34.9	1.4
1982	55.7	12.6	3.9	37.8	1.4
1983	59.4	12.9	4.2	40.9	1.4
1984	63.1	13.2	4.5	44.0	1.4
1985	66.8	13.5	4.7	47.2	1.4
1986	70.5	13.8	5.0	50.3	1.4
1987	72.9	14.0	5.4	52.0	1.5
1988	76.7	14.3	5.8	55.1	1.5
1989	81.3	14.8	6.2	58.8	1.5
1990	85.9	15 2	6.6	62.6	1.5
1991	89.2	15.6	6.9	65.2	1.5
1992	92.4	16.0	7.1	67.8	1.5
1993	95.5	16.3	7.4	70.3	1.5
1994	98.8	16.7	7.7	72.9	1.5
1995	101.9	17.0	8.0	75.4	1.5
1996	105.2	17.4	8.3	78.0	1.5
1997	108.3	17.8	8.5	80.5	1.5
1998	111.5	18.1	8.8	83.1	1.5
1999	114.8	18.5	9.1	85.6	1.6
2000	118.0	18.8	9.4	88.2	1.6

Table 22 MLS

ESTIMATED LOCAL AIRCRAFT OPERATIONS
AT AIRPORTS WITH FAA TRAFFIC CONTROL SERVICE

(In millions)

Fiscal Year	Total	General Aviation	Military
1975	23.5	21.8	1.7
1976	25.6	23.9	1.7
1977	26.8	25.1	1.7
1978	28.0	26.3	1.7
1979	29.1	27.4	1.7
1980	30.3	28.6	1.7
1981	34.1	32.4	1.7
1982	37.8	36.2	1.6
1983	41.5	39.9	1.6
1984	44.8	43.2	1.6
1985	49.1	47.5	1.6
1986	52.9	51.3	1.6
1987	57.5	55.8	1.7
1988	61.9	60.2	1.7
1989	67.1	65.4	1.7
1990	72.8	71.0	1.8
1991	76.1	74.3	1.8
1992	79.4	77.4	1.8
1993	82.7	80.9	1.8
1994	86.0	84.2	1.8
1995	89.2	87.4	1.8
1996	92.5	90.7	1.8
1997	95.8	94.0	1.8
1998	99.1	97.3	1.8
1999	102.2	100.3	1.9
2000	105.5	103.6	1.9

Table 23 MLS

ESTIMATED INSTRUMENT OPERATIONS AT AIRPORTS
WITH FAA TRAFFIC CONTROL SERVICE
(In millions)

Fiscal Year	Total	Air Carrier	Air Taxi	General Aviation	Military	Number TCA's
1975	26.2	9.8	1.5	10.7	4.2	23
1976	27.6	10.3	1.6	11.5	4.2	23
1977	28.7	10.7	1.7	12.1	4.2	23
1978	32.1	11.2	1.9	14.8	4.2	23
1979	35.4	11.6	2.0	17.6	4.2	23
1980	37.6	12.0	2.1	19.3	4.2	23
1981	40.3	12.3	2.4	21.4	4.2	23
1982	43.0	12.6	2.6	23.6	4.2	23
1983	46.1	12.9	2.8	26.2	4.2	23
1984	48.8	13.2	3.0	28.4	4.2	23
1985	51.5	13.5	3.4	30.4	4.2	23
1986	54.2	13.8	3.6	32.6	4.2	23
1987	56.6	14.0	3.8	34.6	4.2	23
1988	59.0	14.3	4.1	36.4	4.2	23
1989	61.7	14.8	4.4	38.3	4.2	23
1990	64.5	15.2	4.8	40.3	4.2	23
1991	67.0	15.6	5.0	42.2	4.2	23
1992	69.6	16.0	5.2	44.2	4.2	23
1993	72.0	16.3	5.4	46.1	4.2	23
1994	74.6	16.7	5.6	48.1	4.2	23
1995	77.1	17.0	5.9	50.0	4.2	23
1996	79.7	17.4	6.1	52.0	4.2	23
1997	82.2	17.8	6.3	53.9	4.2	23
1998	84.7	18.1	6.5	55.9	4.2	23
1999	87.2	18.5	6.7	57.8	4.2	23
2000	89.8	18.8	7.0	59.8	4.2	23

Table 24

ESTIMATED IFR AIRCRAFT HANDLED, IFR DEPARTURES, AND OVERS BY USER CATEGORY

FAA AIR ROUTE TRAFFIC CONTROL CENTERS

(In millions)

Fiscal Year	Air Carrier			Air Taxi			General Aviation			Military		
	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs	Aircraft Handled	IFR Departures	Overs
1975	24.5	9.6	5.3	12.9	4.8	3.3	1.1	.5	.1	6.2	2.7	.8	4.3	1.6	1.1
1976	25.5	10.0	5.5	13.4	5.0	3.4	1.3	.6	.1	6.5	2.8	.9	4.3	1.6	1.1
1977	26.5	10.4	5.7	13.9	5.2	3.5	1.3	.6	.1	7.0	3.0	1.0	4.3	1.6	1.1
1978	27.9	11.0	5.9	14.6	5.5	3,6	1.5	.7	.1	7.5	3.2	1.1	4.3	1.6	1.1
1979	29.1	11.5	6.1	15.1	5.7	3.7	1.7	.8	.1	8.0	3.4	1.2	4.3	1.6	1.1
1980	29.8	11.8	6.2	15.4	5.8	3.8	1.7	.8	.1	8.4	3.6	1.2	4.3	1.6	1.1
1981	31.5	12.5	6.5	15.7	5.9	3.9	2.1	1.0	.1	9.4	4.0	1.4	4.3	1.6	1.1
1982	33.4	13.3	6.8	16.2	6.1	4.0	2.3	1.1	.1	10.6	4.5	1.6	4.3	1.6	1.1
1983	35.0	14.0	7.0	16.5	6.2	4.1	2.5	1.2	.1	11.7	5.0	1.7	4.3	1.6	1.1
1984	36.6	14.7	7.2	16.8	6.3	4.2	2.7	1.3	.1	12.8	5.5	1.8	4.3	1.6	1.1
1985	38.4	15.5	7.4	17.1	6.4	4.3	3.1	1.5	.1	13.9	6.0	1.9	4.3	1.6	1.1
1986	40.0	16.2	7.6	17.4	6.5	4.4	3.3	1.6	.1	15.0	6.5	2.0	4.3	1.6	1.1
1987	42.9	17.5	7.9	18.2	6.8	4.6	3.7	1.8	.1	16.7	7.3	2.1	4.3	1.6	1.1
1988	45.1	18.5	8.1	18.7	7.0	4.7	3.9	1.9	.1	18.2	8.0	2.2	4.3	1.6	1.1
1989	47.7	19.7	8.3	19.2	7.2	4.8	4.3	2.1	.1	19.9	8.8	2.3	4.3	1.6	1.1
1990	50.4	20.9	8.6	19.8	7.4	5.0	4.5	2.2	.1	21.8	9.7	2.4	4.3	1.6	1.1
1991	52.3	21.7	8.9	20.3	7.6	5.1	4.8	2.3	.2	22.9	10.2	2.5	4.3	1.6	1.1
1992	53.7	22.3	9.1	20.6	7.7	5.2	5.0	2.4	.2	23.8	10.6	2.6	4.3	1.6	1.1
1993	55.3	23.0	9.3	21.1	7.9	5.3	5.0	2.4	.2	24.9	11.1	2.7	4.3	1.6	1.1
1994	57.2	23.8	9.6	21.7	8.1	5.5	5.2	2.5	.2	26.0	11.6	2.8	4.3	1.6	1.1
1995	58.9	24.5	9.8	22.2	8.3	5.6	5.4	2.6	.2	26.9	12.0	2.9	4.3	1.6	1.1
1996	60.4	25.2	10.0	22.5	8.4	5.7	5.6	2.7	.2	28.0	12.5	3.0	4.3	1.6	1.1
1997	62.2	26.0	10.2	23.0	8.6	5.8	5.8	2.8	.2	29.1	13.0	3.1	4.3	1.6	1.1
1998	63.7	26.6	10.5	23.6	8.8	5.9	5.8	2.8	.2	30.1	13.4	3.3	4.3	1.6	1.1
1999	65.5	27.4	10.7	24.0	9.0	6.0	6.0	2.9	.2	31.2	13.9	3.4	4.3	1.6	1.1
2000	67.1	28.1	10.9	24.3	9.1	6.1	6.2	3.0	.2	32.3	14.4	3.5	4.3	1.6	1.1

Table 25 MLS

TOTAL FLIGHT SERVICES, PILOT BRIEFS
AND FLIGHT PLANS ORIGINATED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/TOWERS

(In millions)

Fiscal Year	Total Flight Services	Pilot Briefs	Flight Plans Originated		
			Total	IFR-DVFR	VFR
1975	62.7	17.5	8.4	5.4	3.0
1976	69.2	19.6	9.3	6.1	3.2
1977	75.8	21.8	10.1	6.8	3.3
1978	80.9	23.5	10.7	7.3	3.4
1979	87.7	25.9	11.4	7.9	3.5
1980	95.6	28.7	12.3	8.6	3.7
1981	106.5	32.3	13.6	9.7	3.9
1982	117.5	35.8	15.0	10.9	4.1
1983	128.7	39.4	16.4	12.0	4.4
1984	139.7	42.9	17.8	13.2	4.6
1985	150.9	46.5	19.2	14.3	4.9
1986	162.1	50.1	20.6	15.4	5.2
1987	179.4	56.2	22.6	17.3	5.3
1988	195.6	62.0	24.3	18.9	5.4
1989	214.8	68.4	26.5	20.8	5.7
1990	236.0	75.7	28.9	22.9	6.0
1991	247.7	78.6	30.3	24.1	6.2
1992	259.1	83.5	31.6	25.2	6.4
1993	270.9	87.4	33.0	26.4	6.6
1994	282.4	91.3	34.4	27.6	6.8
1995	294.2	95.2	35.8	28.8	7.0
1996	305.8	99.1	37.1	29.9	7.2
1997	316.7	103.0	38.5	31.1	7.4
1998	329.4	106.9	40.0	32.3	7.7
1999	341.4	111.0	41.4	33.5	7.9
2000	352.9	114.9	42.7	34.6	8.1

Table 26 MLS

AIRCRAFT CONTACTED
FAA FLIGHT SERVICE STATIONS AND COMBINED STATION/ TOWERS

(In millions)

Fiscal Year	Total	IFR-DVFR	VFR	Air Carrier	Air Taxi	General Aviation	Military
1975	10.9	2.1	8.8	.3	.8	9.1	.7
1976	11.4	2.4	9.0	.3	.8	9.6	.7
1977	12.0	2.7	9.3	.3	.9	10.1	.7
1978	12.5	3.0	9.5	.3	1.0	10.6	.7
1979	13.1	3.3	9.8	.3	1.0	11.1	.7
1980	13.6	3.6	10.0	.3	1.1	11.5	.7
1981	14.7	4.1	10.6	.3	1.2	12.5	.7
1982	15.9	4.6	11.3	.3	1.3	13.6	.7
1983	17.1	5.1	12 0	.3	1.4	14.7	.7
1984	18.3	5.6	12.7	.3	1.5	15.8	.7
1985	19.5	6.2	13.3	.3	1.6	16.9	.7
1986	20.7	6.8	13.9	.3	1.8	17.9	.7
1987	21.8	7.8	14.0	.3	1.9	18.9	.7
1988	23.0	8.8	14.5	.3	2.0	20.0	.7
1989	25.0	10.2	15.1	.3	2.1	21.9	.7
1990	26.8	11.4	15.7	.3	2.3	23.5	.7
1991	28.2	12.0	16.2	.3	2.4	24.5	.7
1992	28.9	12.6	16.6	.3	2.5	25.4	.7
1993	30.1	13.3	17.1	.3	2.6	26.5	.7
1994	31.0	13.8	17.5	.3	2.7	27.3	.7
1995	32.3	14.5	18.0	.3	2.8	28.4	.7
1996	33.4	15.1	18.5	.3	2.9	29.5	.7
1997	33.7	15.7	18.2	.3	3.0	29.7	.7
1998	35.6	16.4	19.4	.3	3.2	31.4	.7
1999	36.6	17.0	19.8	.3	3.3	32.3	.7
2000	37.7	17.6	20.3	.3	3.4	33.3	.7

Task 2

Original Program:

Task 2 was originally stated as follows:

Characteristics of User Operations - As a minimum, the following additional information will be provided as background in depicting the nature of user operations:

- G.A./air carrier fleet mix and operating characteristics, e.g., operating costs; range; and number of aircraft types in fleet.
- Airline personnel force size; nature of airline competition.
- Aircraft avionics capabilities, cost and distribution.

Modifications to Original Program:

This task was modified to provide the following information:

- Identification and quantification by percentage of the air carrier fleet in operation (at five year intervals) between 1975 and 2000 nationally and at the top 85 airports in the country.
- Future character of the system in the year 2000 in terms of cargo hauled, load factor, stage length, trip length, and aircraft seat capacity.
- Forecasts of G.A. aircraft avionic capability for 1981, 1986, and 1995.

EQUIPMENT FORECAST FOR TOP 25 AIR CARRIER AIRPORTS 1975-2000

The following section contains a forecast of equipment types to be used by the air carriers through the year 2000 at the top 25 passenger enplanement airports. This forecast is given in the percentage each equipment type will produce of the total air carrier operations. The equipment types are classified into groups that are in operation today or are known to be in the design stage. It is assumed that derivatives of the wide-body jets will be available in the later part of the forecast period, however, they are classified by today's designation for this forecast. The equipment in each major group including both passenger and all cargo models is as follows:

747	;	747 and derivatives of 747
DC10/1011	;	DC-10. L-1011 and derivatives
DC8 STR	;	DC8-61/63
707/DC8	;	All models of 707, all models of standard DC8, 720, CV880, all models of standard body foreign built four engine jets
727 STR	;	727-200, 727-300, 707
727-100	;	All models of 727-100
DC9/737	;	All models of DC9, 737 and all foreign built twin engine standard body jets
T-PROP	;	All turbo-prop aircraft models
PISTON	;	All piston engine aircraft models
HELO	;	All helicopter models

Table 26: Estimated Active General Aviation Aircraft
(in thousands)

As of January 1	Fleet	As of January 1	Fleet
1975*	161.5	1988	268.5
1976	167.0	1989	281.7
1977	172.0	1990	294.3
1978	178.0	1991	308.1
1979	184.0	1992	322.6
1980	189.0	1993	337.8
1981	195.0	1994	353.6
1982	202.0	1995	370.3
1983	212.1	1996	387.6
1984	222.7	1997	405.9
1985	233.8	1998	424.6
1986	245.0	1999	444.9
1987	256.0	2000	465.8
		2001	487.7

Table 27: Estimated Distribution by Type of Aircraft
(as a percent of total active fleet)

As of January 1	Piston		Turbine	Rotorcraft	Ballons Dirigibles Gliders
	Single-engine	Multi-engine			
1975*	81.54%	12.46%	2.48%	2.04%	1.48%
1980	79.36	13.55	3.50	2.06	1.53
1985	77.76	14.42	4.21	2.07	1.54
1990	76.16	15.29	4.91	2.09	1.55
1995	74.56	16.16	5.62	2.10	1.56
2001	72.96	17.03	6.30	2.12	1.59

* Historical data

Table 28:

AIR CARRIER FLEET

	TOTAL FLEET	JETS			TURBO PROP		PISTON	HELI
		2 ENG	3 ENG	4 ENG	2 ENG	4 ENG		
1975	2526	541	926	627	223	73	126	10
76	2609							
77	2687							
78	2762							
79	2838							
80	2907	720	1,234	615	213	50	60	15
81	2975							
82	3095							
83	3185							
84	3259							
85	3333	640	1,973	625	50	25	--	20
86	3407							
87	3456							
88	3530							
89	3654							
90	3753	580	2,473	650	15	10		25
91	3851							
92	3950							
93	4024							
94	4123							
95	4197	520	2,962	685	--	--	--	30
96	4296							
97	4395							
98	4469							
99	4567							
2000	4641	460	3,436	710	--	--	--	35

Based on July 1975 data.

Table 29

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT ATLANTA

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	1	2	3	4	6
DC10/1011	8	13	17	21	25	29
DC8 STR	3	2	2	-	-	-
707/DC8	5	2	-	-	-	-
727 STR	23	30	33	37	40	43
727-100	9	6	4	-	-	-
DC9/737	47	44	42	39	31	22
T-PROP	2	2	-	-	-	-
PISTON	2	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT BOSTON

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	2	4	6	7	8	10
DC10/1011	4	9	13	17	19	24
DC8 STR	3	2	1	-	-	-
707/DC8	13	10	4	2	-	-
727 STR	15	20	25	30	33	35
727-100	14	11	6	2	-	-
DC9/737	29	32	38	42	40	31
T-PROP	18	13	7	-	-	-
PISTON	3	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT CHICAGO - O'HARE

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	3	5	8	11	13	15
DC10/1011	9	15	19	23	27	30
DC8 STR	3	2	1	-	-	-
707/DC8	14	7	3	1	-	-
727 STR	18	26	33	35	38	38
727-100	20	11	5	2	-	-
DC9/737	23	30	31	28	22	17
T-PROP	9	4	-	-	-	-
PISTON	1	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT CLEVELAND

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	1	2	3	4	6
DC10/1011	5	10	15	20	24	28
DC8 STR	3	3	2	1	-	-
707/DC8	11	6	2	-	-	-
727 STR	10	15	22	28	30	32
727-100	26	21	12	3	-	-
DC9/737	36	40	45	45	42	34
T-PROP	8	4	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT DALLAS/FT. WORTH

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	1	2	3	4	6
DC10/1011	4	9	13	17	20	23
DC8 STR	1	-	-	-	-	-
707/DC8	14	7	3	-	-	-
727 STR	29	37	40	44	46	46
727-100	26	19	9	-	-	-
DC9/737	19	25	33	36	30	25
T-PROP	6	2	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT DENVER

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	1	2	3	4	6
DC10/1011	7	11	15	19	22	26
DC8 STR	2	-	-	-	-	-
707/DC8	7	3	-	-	-	-
727 STR	25	30	35	37	40	42
727-100	19	15	7	-	-	-
DC9/737	23	31	41	41	34	26
T-PROP	12	9	-	-	-	-
PISTON	4	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT DETROIT

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	4	6	9	12
DC10/1011	12	17	21	25	29	33
DC8 STR	2	2	2	1	-	-
707/DC8	15	9	6	3	-	-
727 STR	13	18	21	26	29	31
727-100	18	14	10	3	-	-
DC9/737	25	34	36	36	33	24
T-PROP	14	4	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT HONOLULU

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	19	25	28	30	33	35
DC10/1011	9	15	18	20	22	24
DC8 STR	1	1	1	1	-	-
707/DC8	20	8	5	3	-	-
727 STR	-	-	8	14	20	25
727-100	-	-	-	-	-	-
DC9/737	51	51	40	32	25	16
T-PROP	-	-	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

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Table 29 (Continued)
EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT HOUSTON

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	3	4	6	8
DC10/1011	6	9	14	18	22	24
DC8 STR	2	2	2	-	-	-
707/DC8	10	6	2	-	-	-
727 STR	36	40	44	48	50	52
727-100	18	11	5	-	-	-
DC9/737	23	28	30	30	22	16
T-PROP	4	2	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT KANSAS CITY

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	-	-	1	2	2	3
DC10/1011	1	4	5	7	9	11
DC8 STR	-	-	-	-	-	-
707/DC8	6	2	-	-	-	-
727 STR	42	50	56	57	58	58
727-100	15	8	2	-	-	-
DC9/737	17	27	36	34	31	28
T-PROP	19	9	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT LAS VEGAS

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	2	3	5	7	9	11
DC10/1011	4	10	14	18	22	26
DC8 STR	3	2	2	-	-	-
707/DC8	18	9	3	-	-	-
727 STR	13	19	24	27	28	29
727-100	7	4	2	-	-	-
DC9/737	53	53	50	48	41	34
T-PROP	-	-	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT LOS ANGELES

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	7	9	13	17	20	23
DC10/1011	15	20	25	30	33	36
DC8 STR	2	2	1	-	-	-
707/DC8	25	15	7	3	-	-
727 STR	23	31	34	36	36	36
727-100	11	5	2	-	-	-
DC9/737	16	19	18	14	11	5
T-PROP	1		-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT MIAMI

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	3	5	7	9	11	14
DC10/1011	14	20	24	27	30	33
DC8 STR	2	2	2	-	-	-
707/DC8	15	8	3	2	-	-
727 STR	22	30	35	38	40	40
727-100	21	10	6	2	-	-
DC9/737	19	23	23	22	19	13
T-PROP	2	2	-	-	-	-
PISTON	2	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT MINNEAPOLIS/ST. PAUL

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	2	4	6	7	8	9
DC10/1011	10	14	17	20	23	26
DC8 STR	-	-	-	-	-	-
707/DC8	5	2	-	-	-	-
727 STR	25	30	35	37	39	40
727-100	21	12	6	-	-	-
DC9/737	27	33	36	36	30	25
T-PROP	10	5	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)
EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT NEW ORLEANS

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	-	1	2	4	6	8
DC10/1011	6	10	14	18	21	24
DC8 STR	7	5	2	-	-	-
707/DC8	7	3	-	-	-	-
727 STR	25	30	35	38	42	43
727-100	13	7	2	-	-	-
DC9/737	38	42	45	40	31	25
T-PROP	3	2	-	-	-	-
PISTON	1	-	-	-	-	-
HELO	0	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT NEWARK

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	4	6	7	9
DC10/1011	6	10	14	18	21	24
DC8 STR	3	2	2	-	-	-
707/DC8	15	7	3	-	-	-
727 STR	13	20	24	30	32	34
727-100	17	13	7	2	-	-
DC9/737	24	32	34	32	29	23
T-PROP	9	2	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	12	12	12	12	11	10
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT NEW YORK - KENNEDY

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	13	16	20	24	28	32
DC10/1011	9	15	20	24	28	30
DC8 STR	3	3	2	1	-	-
707/DC8	32	19	10	5	-	-
727 STR	10	15	20	22	23	25
727-100	14	10	4	-	-	-
DC9/737	13	16	18	18	16	8
T-PROP	-	-	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	6	6	6	6	5	5
	100%	100%	100%	100%	100%	100%

AIRPORT NEW YORK - LA GUARDIA

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	-	-	-	-	-	-
DC10/1011	4	8	13	17	20	23
DC8 STR	-	-	-	-	-	-
707/DC8	-	-	-	-	-	-
727 STR	22	30	37	40	43	46
727-100	28	17	5	2	-	-
DC9/737	29	33	35	31	27	21
T-PROP	6	2	-	-	-	-
PISTON	1	-	-	-	-	-
HELO	10	10	10	10	10	10
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT PHILADELPHIA

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	3	4	5	6
DC10/1011	5	8	11	14	17	20
DC8 STR	2	1	1	1	-	-
707/DC8	11	6	3	-	-	-
727 STR	15	22	28	32	34	34
727-100	14	8	4	2	-	-
DC9/737	29	42	50	49	44	40
T-PROP	23	11	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT PITTSBURGH

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	3	4	5	6
DC10/1011	2	4	8	11	14	17
DC8 STR	1	-	-	-	-	-
707/DC8	3	1	-	-	-	-
727 STR	7	14	20	24	27	30
727-100	15	8	4	1	-	-
DC9/737	49	61	65	60	54	47
T-PROP	22	10	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT SAN FRANCISCO

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	6	8	10	13	16	19
DC10/1011	8	13	18	22	26	29
DC8 STR	3	2	2	1	-	-
707/DC8	19	13	5	2	-	-
727 STR	19	27	33	37	40	40
727-100	13	8	4	2	-	-
DC9/737	22	20	19	15	10	5
T-PROP	1	-	-	-	-	-
PISTON	0	-	-	-	-	-
HELO	9	9	9	8	8	7
	100%	100%	100%	100%	100%	100%

AIRPORT SEATTLE

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	5	6	8	10	12	14
DC10/1011	15	20	24	28	32	36
DC8 STR	5	5	2	1	-	-
707/DC8	16	10	5	2	-	-
727 STR	19	29	41	44	44	44
727-100	25	15	5	2	-	-
DC9/737	12	15	15	13	12	6
T-PROP	3	-	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

Table 29 (Continued)

EQUIPMENT FORECAST 25 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORT ST. LOUIS

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	-	-	2	3	4	6
DC10/1011	3	7	12	16	20	24
DC8 STR	-	-	-	-	-	-
707/DC8	12	7	3	1	-	-
727 STR	18	25	30	35	38	40
727-100	15	8	4	-	-	-
DC9/737	42	49	49	45	38	30
T-PROP	10	4	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

AIRPORT TAMPA

	Actual	Forecast				
	1975	1980	1985	1990	1995	2000
747	1	2	3	4	5	6
DC10/1011	10	15	19	23	26	29
DC8 STR	2	2	2	1	-	-
707/DC8	6	3	1	-	-	-
727 STR	40	50	53	56	57	58
727-100	18	8	2	-	-	-
DC9/737	21	20	20	16	12	7
T-PROP	2	-	-	-	-	-
PISTON	-	-	-	-	-	-
HELO	-	-	-	-	-	-
	100%	100%	100%	100%	100%	100%

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EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1075-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AVP-120

Equipment Forecast for 26 - 85 Ranked Air Carrier Airports - 1975-2000

The following section contains a forecast of equipment types to be used by the air carriers through the year 2000, at the 26th through 85th airports ranked by passenger enplanements. This forecast is given in the percentage each equipment type will produce of the total air carrier operations. The equipment types are classified into groups that are in operation today or are known to be in the design stage. It is assumed that derivatives of the widebody jets will be available in the later part of the forecast period; however, they are classified by today's designation for this forecast. The equipment in each major group, including both passenger and all cargo models, is as follows:

747; 747 and derivatives of 747

D10/L10; DC-10, L-1011 and derivatives

4 Engine; DC8-61/63, all models of 707, all models of standard DC8, 720, CV880, all models of standard body foreign built four engine jets

3 Engine; 727-200, 727-300, 7X7, all models of 727-100

2 Engine; All models of DC9, 737 and all foreign built twin engine standard body jets.

T-Prop; All turbo-prop aircraft models

Heli; All helicopter models

Table 30

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS AUS, BNA, BOI, BUF, CAE, GSO, IND, JAN, LIT, MEM, ORF, RDU. RIC, ROC, SDF, SLC, SYR

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	4	7	9	11	13
Standard Body					
4 Engine					
3 Engine	32	35	37	39	41
2 Engine	60	58	54	50	46
Turboprop	4				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS CLT, CMH, CVG, DAY, MKE

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	8	11	13	15	18
Standard Body					
4 Engine	2				
3 Engine	37	39	41	43	45
2 Engine	48	50	46	42	40
Turboprop	5				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS PHX, TUS

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	10	14	18	22	26
Standard Body					
4 Engine	11	5	-	-	-
3 Engine	36	39	40	44	48
2 Engine	43	42	42	34	26
Turboprop	-	-	-	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS BUR, CHS

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	4	7	10	13	16
Standard Body					
4 Engine					
3 Engine	72	73	74	75	75
2 Engine	20	20	16	12	9
Turboprop	4				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS SNA

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10					
Standard Body					
4 Engine					
3 Engine	6	15	23	29	35
2 Engine	94	85	77	71	65
Turboprop					

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS OAK

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	6	9	12	15	18
Standard Body					
4 Engine					
3 Engine	44	47	47	47	47
2 Engine	25	21	19	17	15
Turboprop	-				
HELI	25	23	22	21	20

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS GEG, OMA, RNO

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	10	12	14	17	20
Standard Body					
4 Engine					
3 Engine	55	58	60	60	60
2 Engine	30	30	26	23	20
Turboprop	5				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS BDL, BAL

	FORECAST				
	1980	1985	1990	1995	2000
747	1	2	3	5	7
D10/L10	10	13	16	18	21
Standard Body					
4 Engine	8	3			
3 Engine	30	32	34	35	35
2 Engine	52	50	47	42	37
Turboprop					

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS PDX, SAN

	FORECAST				
	1980	1985	1990	1995	2000
747		2	3	4	6
D10/L10	15	17	19	21	23
Standard Body					
4 Engine	10	3			
3 Engine	55	58	60	60	60
2 Engine	20	20	18	15	11
Turboprop					

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS FLL, MCO, PBI

	FORECAST				
	1980	1985	1990	1995	2000
747	-	-	1	3	5
D10/L10	20	24	27	30	33
Standard Body					
4 Engine	8	4	-	-	-
3 Engine	50	52	54	53	52
2 Engine	22	20	18	14	10
Turboprop	-	-	-	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS ELP, ICT, JAX, OKC, TUL, SAT

	FORECAST				
	1980	1985	1990	1995	2000
747	-	-	-	-	-
D10/L10	6	9	14	18	22
Standard Body					
4 Engine	5	2	-	-	-
3 Engine	69	69	66	66	66
2 Engine	17	20	20	16	12
Turboprop	3	-	-	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS LIH, OGG

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10					
Standard Body					
4 Engine					
3 Engine		4	8	14	20
2 Engine	96	96	92	88	80
Turboprop	4				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS ITO

	FORECAST				
	1980	1985	1990	1995	2000
747	8	11	13	15	17
D10/L10	12	15	17	19	21
Standard Body					
4 Engine	3	2	-	-	-
3 Engine	-	8	14	20	25
2 Engine	70	64	56	46	37
Turboprop	7	-	-	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS ANC

	FORECAST				
	1980	1985	1990	1995	2000
747	19	22	26	29	31
D10/L10	15	18	20	22	24
Standard Body					
4 Engine	9	6	4	-	-
3 Engine	15	17	19	22	24
2 Engine	27	29	28	27	21
Turboprop	15	7	3	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS IAD

	FORECAST				
	1980	1985	1990	1995	2000
747	8	10	12	15	18
D10/L10	9	14	18	23	26
Standard Body					
4 Engine	25	12	5	-	-
3 Engine	30	36	37	38	38
2 Engine	26	28	28	24	18
Turboprop	2	-	-	-	-

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS ALB, BHM, TYS

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10		2	4	6	8
Standard Body					
4 Engine					
3 Engine	20	23	25	27	29
2 Engine	80	75	71	67	63
Turboprop					

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS ABQ, DSM, PVD, SJC, SMF

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10	2	5	8	11	14
Standard Body					
4 Engine					
3 Engine	48	50	53	55	57
2 Engine	47	45	39	34	31
Turboprop	3				

Table 30 (Continued)

EQUIPMENT FORECAST 26-85 TOP AIR CARRIER AIRPORTS 1975-2000

PERCENT OF AIR CARRIER OPERATIONS BY EQUIPMENT TYPE

AIRPORTS MDW

	FORECAST				
	1980	1985	1990	1995	2000
747					
D10/L10		6	9	12	15
Standard Body					
4 Engine					
3 Engine	25	28	30	33	35
2 Engine	37	38	36	33	30
Turboprop	8				
HELI	30	28	25	22	20

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FUTURES INPUT TO UG3RD STUDY

FUTURE CHARACTER OF SYSTEM USE

1. Increased reliance on aviation for pleasure travel because of widespread use of smaller cars, longer vacation time and fewer children per married couple.

2. 25.0 billion ton miles freight hauled domestically in the year 2000 compared to 2.8 in 1974.

3. Probably significantly more ATC staffing and commercial flying by women due to 50 percent female participation in the labor force.

4. Average domestic air carrier load factor in 2000, 60 percent.

5. Average stage length in 2000, 550 miles.

6. Average trip lengths in 2000, 800 miles.

7. Average seats per aircraft in 2000, 200 seats.

Table 31: Forecasts of General Aviation Aircraft Equipped with Transponders

Calendar year	Active fleet	Equipped with Beacon Transponders	Equipped with Altitude Encoders
1974	164,900	119,453	9,317
1981	203,000	162,400	30,450
1986	245,600	196,480	36,840
1995	417,300	375,570	375,570

Task 3

Original Program:

Task 3 was originally stated as follows:

The Airport Status - The airport environment will be described in its evolution to the year 2000. This description will include a treatise of new airport locations; airport inventory; expansions of existing airports; shifts in airport functional roles, e.g., general aviation to reliever; and terminal air and landside considerations.

Modifications to Original Program:

- Terminal air considerations (capacity constraints) were subsumed in the development of "forecasts" (Task 1).
- Landside considerations (capacity constraints) were subsumed in the development of "limiting system factors" (Task 5).
- No other changes were made to the original task content.

NATIONAL AIRPORT SYSTEM PLAN (NASP)

INFORMATION

Source: ASP

Available in computer
printout format.
See Gene Mercer, AVP-120

Airport Status

1. A few large new regional airports introduced after 1985. Airports connected to cities by high speed ground transportation.

2. Greater landside capacity because of more efficient, passenger, baggage, and cargo technology.

3. Airports more environmentally acceptable because of reduced noise generating characteristics and large areas of new airports.

Source: AVP-110

Task 4

Original Program:

Task 4 was originally stated as follows:

Regulatory and Economic - The nature of the national aviation system regulatory and economic climate will be detailed with specific attention paid to route structuring (CAB authority); cost allocation; government subsidies (ADAP/PGP); head taxes, airport curfews, quotas, and peak hours pricing; and international related considerdations.

Modifications to Original Program:

None

Economic and Regulatory

The following assumptions were used about the nature of the general economic climate and the national aviation system for The Baseline and Implementation Scenario of the evaluation of the UG3RD air traffic control system.

General Economic Climate

The factors discussed here include those general economy variables that will have a major effect on the future of the national aviation system. The Nation's gross national product (GNP) in constant 1958 dollars is forecast to increase from 784 billion (est) in 1975 to $1,169 billion in 1985, an average growth rate of 4.0 percent per year. GNP is estimated to reach $1,870 billion by the year 2000 at an average growth rate of 3.2 percent per year. See figure 1.

Total personal consumption expenditures are expected to increase from $533 billion (est) in constant 1958 dollars in 1975 to $770 billion in 1985 and $1,201 billion in 2000. See figure 2.

The inflation rate will decrease from 10.1 percent (est) in 1975 to an average of 7.1 percent per year until 1980, then 5.5 percent per year from 1980 to 1985, and then 5 percent per year from 1985 until 2000.

The unemployment rate will decrease from 9.3 percent (est) in 1975 to 6.6 percent by 1980, 5.3 percent by 1985 and then an average 5.0 percent per year until 2000. See figure 3.

The productivity index which is a measure of output per man-hour is forecast to increase throughout the forecast period. Using 1967 as the base year (1967 = 100) the 1975 index is estimated to be 118.9, 1985 index equals 161.1, and by 2000 the index is forecast to reach approximately double the 1967 index. See figure 4.

National Aviation System 1975-2000

It is assumed for the baseline and implementation scenarios that the aviation policy portion of the general transportation policy principles as stated in the National Transportation Policy is approved and put into effect. The aviation policy is subdivided into two priority areas, domestic and international.

Domestic Air Policy Priorities:

- Maintain aviation's excellent safety record; enhance existing safety regulations; drop unnecessary regulations and continue to upgrade the air traffic control system to reflect the needs of different users;

- Reform the air regulatory structure through increased pricing flexibility, some liberalization of entry and exit policy over a transitional period, prevent anticompetitive practices and expedite administrative processes. Permit air carriers to lower prices without regulatory interference to the direct cost level, permitting

some upward price flexibility subject to supervision by the CAB. Free carriers from cumbersome certificate restrictions, permit some sensible expansion by existing firms into new markets and encourage some new entrants;

- Take measures to foster more efficient use of fuel, consistent with the national objectives of fuel conservation and market allocation of energy resources. Over the long term, the increase of load factors from 55 percent to 65 percent to promote more efficient use of fuel. The Federal Aviation Administration will continue to stress conservation measures;

- Strengthen the financial viability of the well-managed carriers by ascertaining and encouraging the optimal domestic industry size, number of airlines and route structure to provide reliable long-haul trunk line service between major cities, to assure adequate service to smaller communities and to enable healthy competition between efficient carriers, permitting them to earn a reasonable rate of return on capital;

- Modernize Federal financing policies to determine when subsidies are appropriate for maintaining essential services that are unprofitable but in the national interest;

- Improve the equity of the airports and airways user charge system;

- Improve airport planning consistent with regional land use planning, projected capacity requirements nationwide, fairness among state and metropolitan areas and environmental protection (such as noise abatement);

- Define the Government's responsibility for promoting financially viable and competitive air carrier, airframe and engine manufacturing industries;

- Recognize and support the development of general aviation, consistent with the need for it to pay its own way to the extent appropriate.

International Air Policy Priorities:

- Seek a more rational international route structure by identifying routes that are in the national interest, maximizing fuel efficiency and minimizing adverse environmental impact developing improved domestic-international route system integration and establishing the relative roles of scheduled and charter service;

- Promote a stronger U.S. flag carrier system through an affirmative action program to represent U.S. foreign and commercial policy interests before international bodies and to protest vigorously anticompetitive and discriminatory practices by subsidized foreign carriers;

- Seek fare structures that permit efficient, unsubsidized U.S. air carriers to earn a reasonable return on investment in order to attract capital from the private sector and to provide job opportunity;

- Facilitate efforts by the U.S. airframe and engine manufacturing industry to maintain its leading role in international aviation.

Assumptions dealing with airport planning and funding were also taken from the National Transportation Policy. These assumptions are:

Air Carrier Airports:

In selecting air carrier airports for funding, the following considerations are relevant:

- Airport planning should be in conjunction with planning for the other transportation modes and consistent with metropolitan and regional development plans;

- Federal support should emphasize airports that serve national interests but are unable to finance the full costs (large airports are often the ones best able to finance development without Federal aid);

- The role of "transfer hubs," such as Chicago and Atlanta, should be evaluated and planned in terms of the entire air carrier route structure.

General Aviation Airports:

General aviation airports serve primarily the residents of the surrounding area and are, therefore, an appropriate subject for increased state program flexibility and authority with fewer Federal restrictions. The Airport Development Aid Program provides block grants of assistance for general aviation airports to each state to be administered by the state.

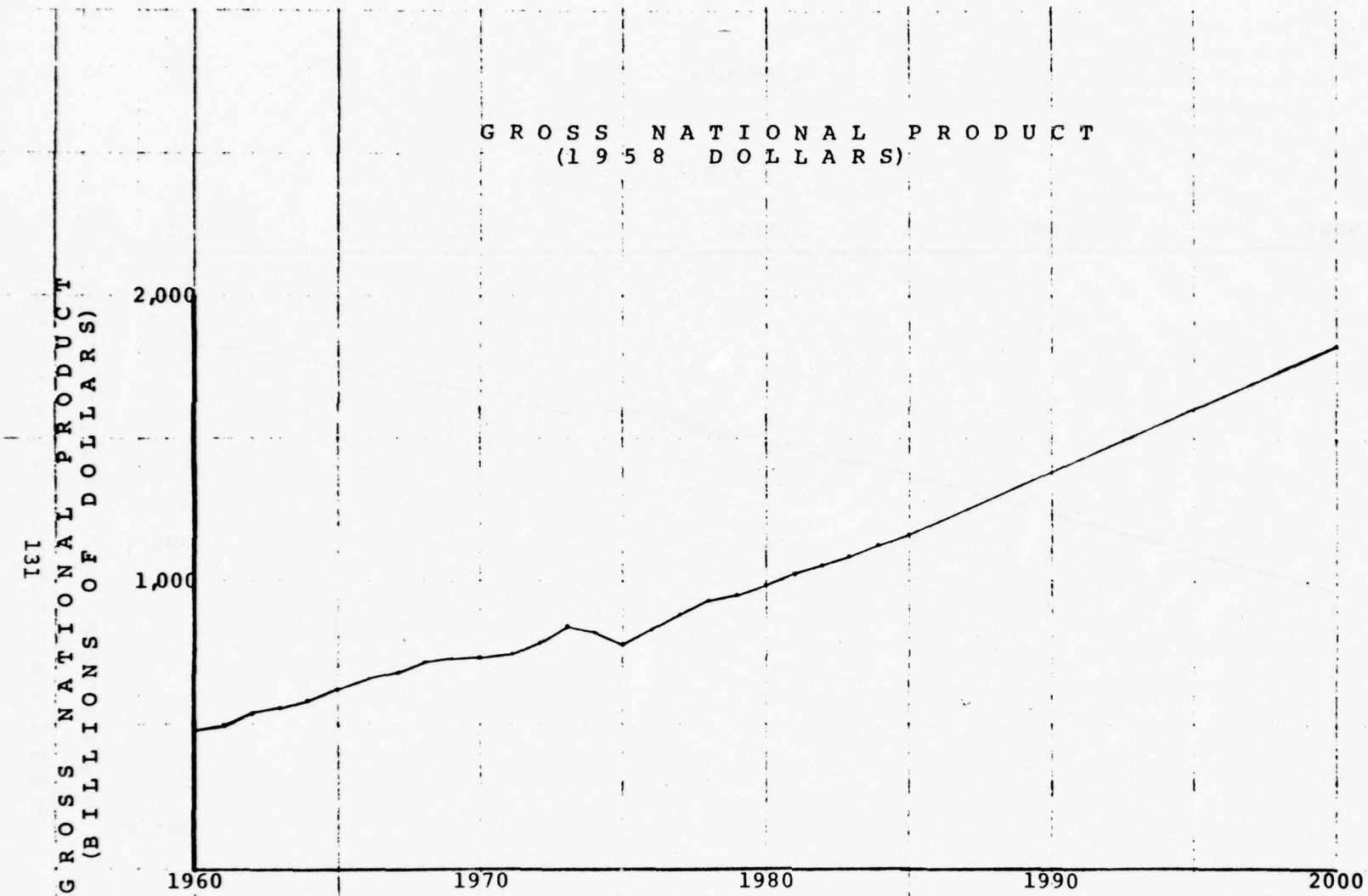

GROSS NATIONAL PRODUCT
(1958 DOLLARS)
GROSS NATIONAL PRODUCT
(BILLIONS OF DOLLARS)
2,000
1,000
1960
1970
1980
1990
2000

FIGURE 1

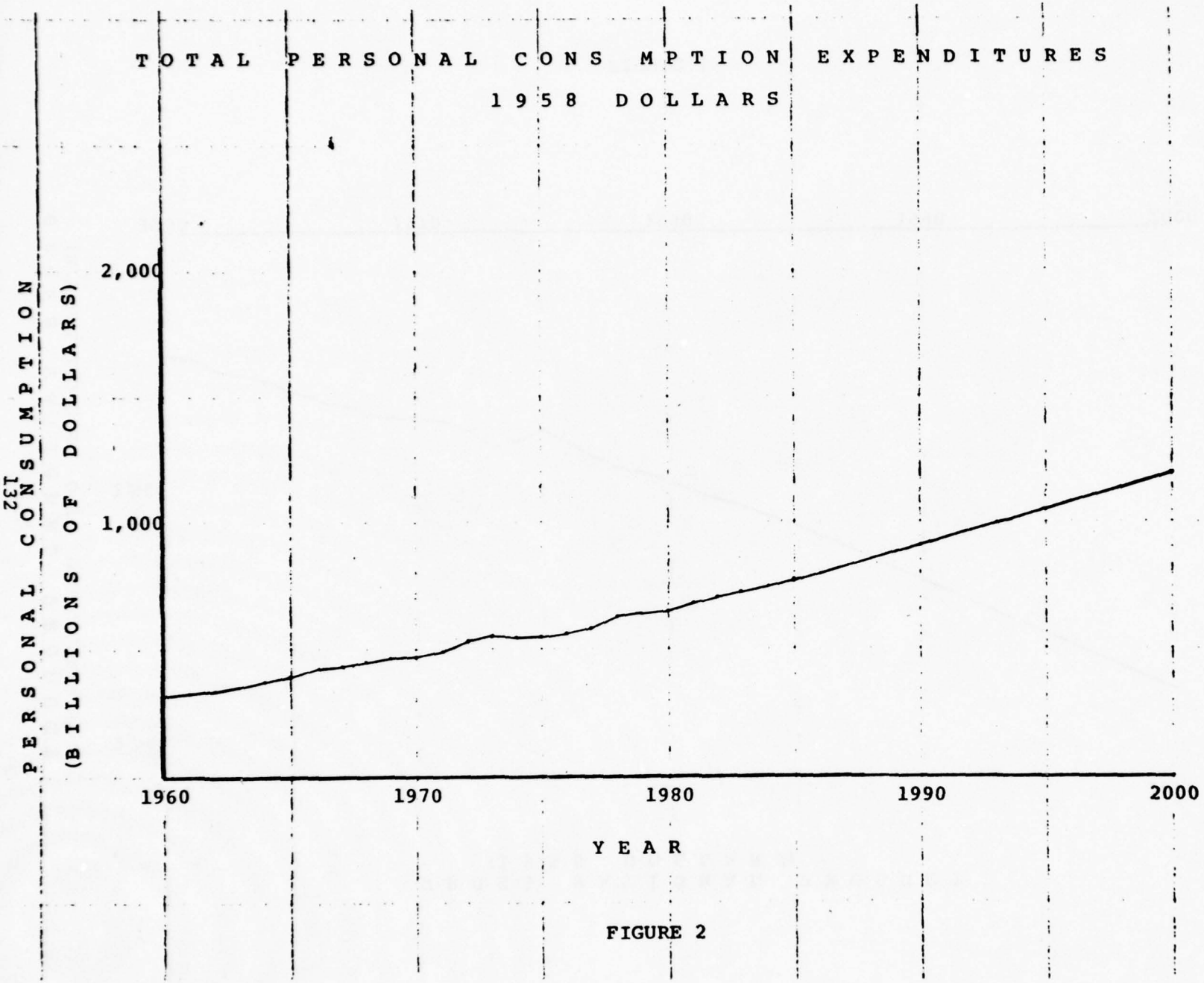

TOTAL PERSONAL CONSUMPTION EXPENDITURES
1958 DOLLARS
PERSONAL CONSUMPTION
(BILLIONS OF DOLLARS)
2,000
1,000
1960
1970
1980
1990
2000
YEAR

FIGURE 2

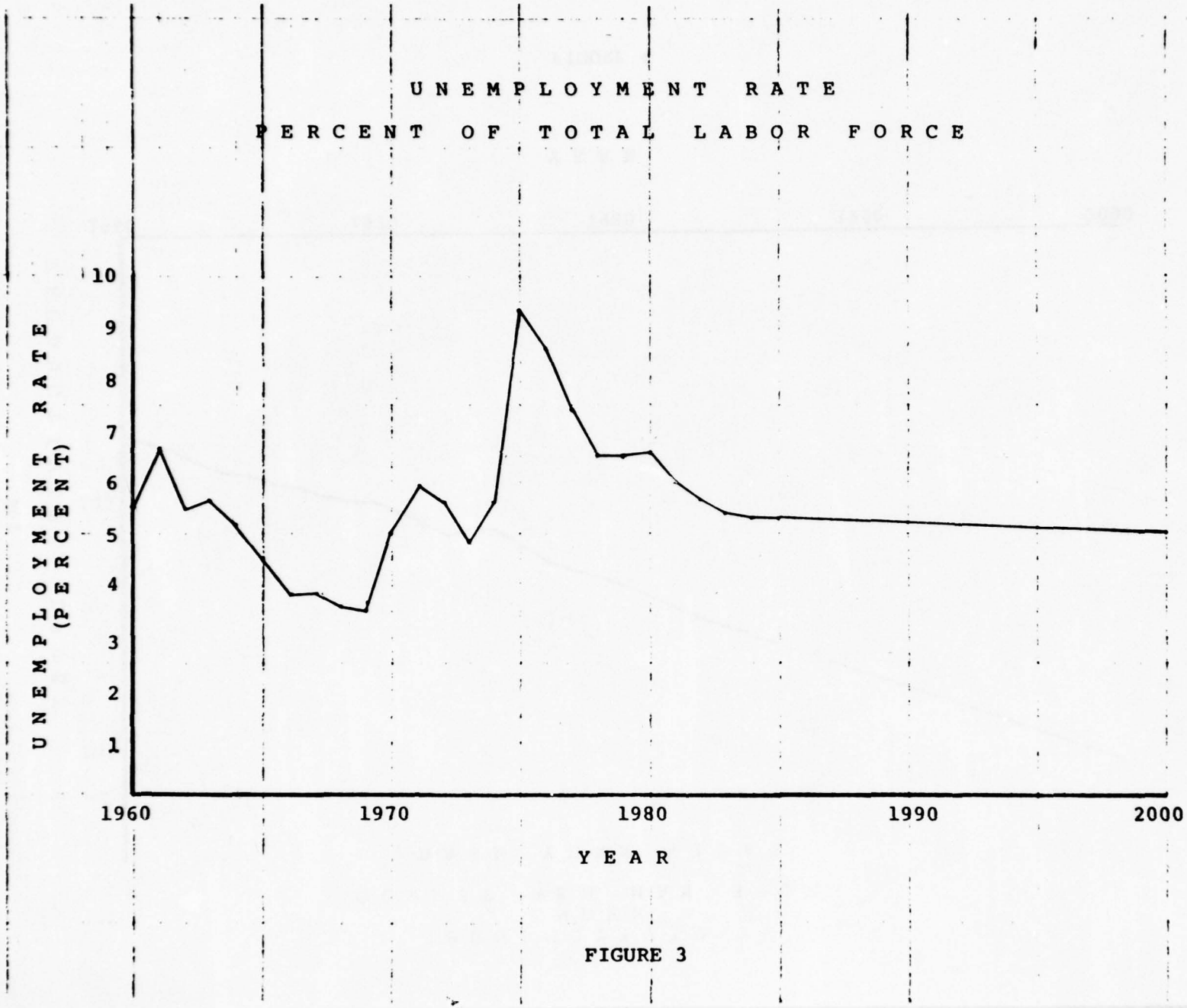

UNEMPLOYMENT RATE
PERCENT OF TOTAL LABOR FORCE
UNEMPLOYMENT RATE (PERCENT)
10
9
8
7
6
5
4
3
2
1
1960
1970
1980
1990
2000
YEAR

FIGURE 3

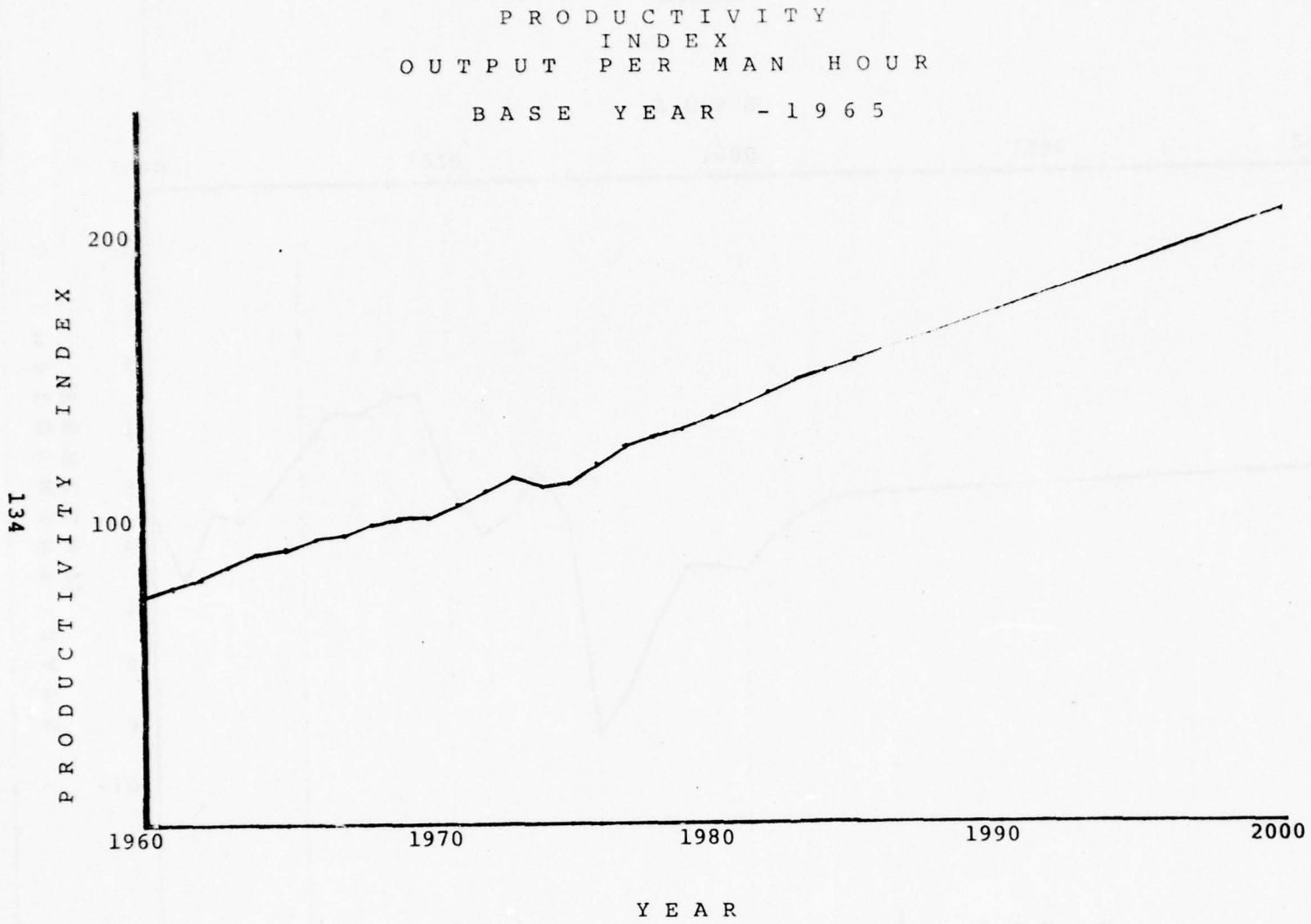

PRODUCTIVITY
INDEX
OUTPUT PER MAN HOUR
BASE YEAR - 1965
200
100
PRODUCTIVITY INDEX
1960
1970
1980
1990
2000
YEAR

FIGURE 4

Task 5

Original Program:

Task 5 was originally stated as follows:

Limiting System Factors - A description of system constraints will be provided as well as an attempt to quantify those constraints consistent with system operating parameters. Specific constraint areas will include energy; airspace; airport access; airport terminal area; strategic raw building materials, e.g., aluminum; and personnel (industry and government).

Modification to Original Program:

- Airspace constraint areas (capacity) were subsumed in the development of "forecasts" (Task 1).
- Consideration of aviation-related personnel (industry and government) was dropped from the task.
- No other changes were made to the task content.

ENERGY AND OTHER STRATEGIC RAW MATERIALS AS LIMITING SYSTEM FACTORS

Overview

Rising prices and shortages of essential resources, particularly fuel, created problems in all areas of transportation in the late 1970's.

Awareness of the problem grew with the increasing anxiety and frustration faced by everyone trying to get through his daily life. Nowhere was this more apparent than in the area of transportation. With transportation keyed closely to industrial needs and leisure time expression, failure to meet demand adequately in this area rapidly became readily apparent. Inadequacies in the transportation system had threatening feedback effects on all parts of the economy. While inability to meet demands for energy and raw materials in the 1970's continued to be a problem in the face of a growing need for environmental control, it was the impact on transportation that brought the message most clearly to the average citizen. He faced increasing costs for transportation and simultaneously, through equipment shortages, decreasing service in terms of delays and discomfort. These effects were felt in all modes of transportation and were especially compounded when transfer from one mode to another was required.

Though rising fuel costs for private cars did little to relieve urban vehicular congestion, it did at last make clear the need for public mass transit. The need for federally-sponsored integrated multi-modal transportation systems became politically acceptable as a hoped-for way out of the frustrations which were affecting nearly everyone.

As a result of government action to allocate resources, the 1980's saw far reaching changes in transportation: (1) automobiles became smaller, more efficient, and were relied upon for relatively short distance travel; (2) inter-corridor high speed ground transportation was developed for the Northeast, the coast of California, and in the area of the Midwest; and (3) efficient mass transit systems were being evolved which helped revitalize urban centers. Together, these changes provided for a more efficient use of energy and for other raw materials, and improved land use.

As a result of these changes, rail transportation gained a larger share of the short-haul intercity market, but air transportation was still the key element in long-haul intercity travel.

The cost of crude oil and the resulting levels of utilization of jet fuel and aviation gasoline are depicted in Figures 5-1 and 5-2, respectively.

The cost of aluminum and iron ore, two additional resources critical to the aviation industry, are depicted in Figures 5-3 and 5-4, respectively.

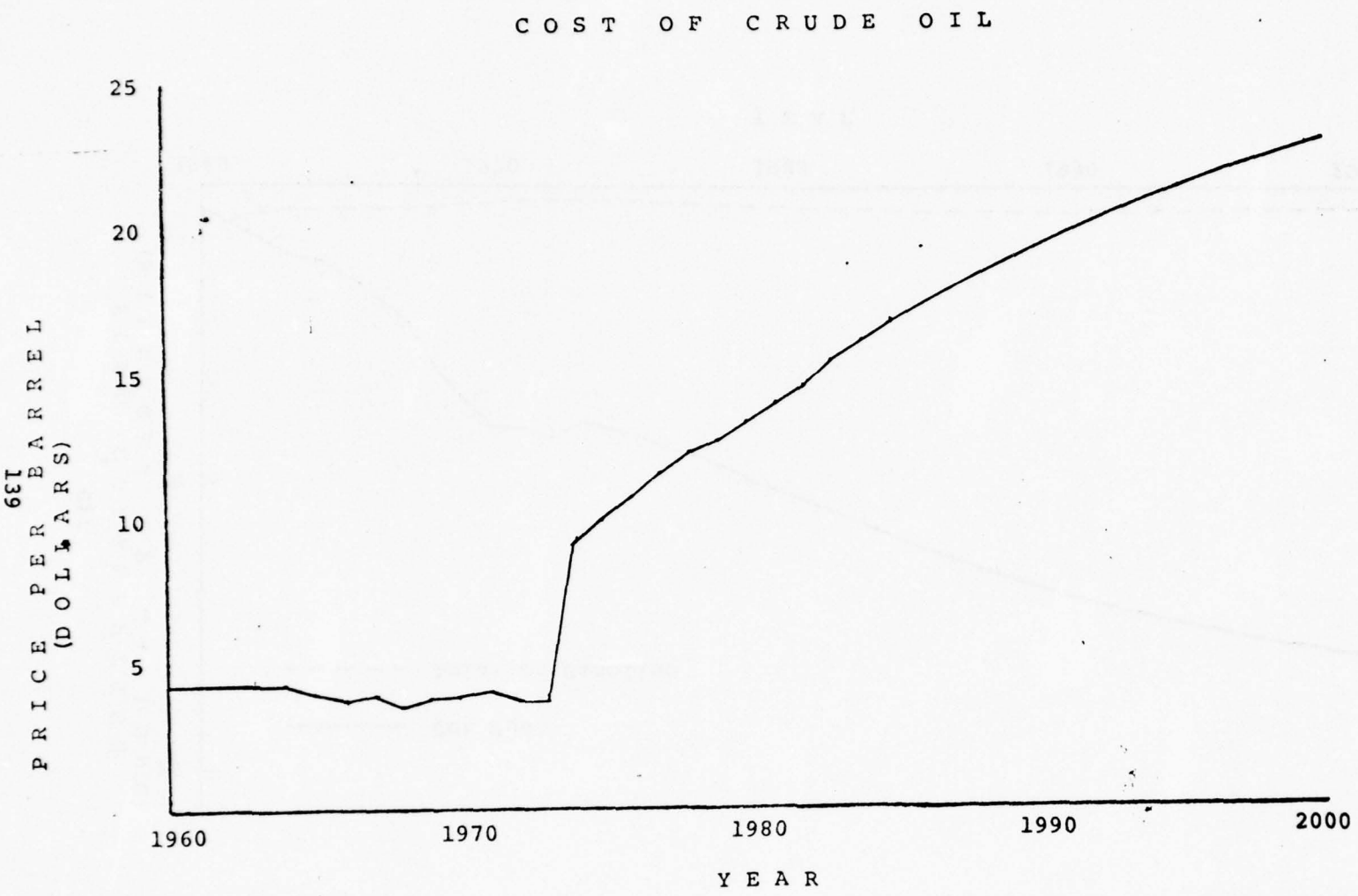

COST OF CRUDE OIL
25
20
15
10
5
PRICE PER BARREL
(DOLLARS)
1960
1970
1980
1990
2000
YEAR

FIGURE 5

FUEL C. SUMPTION

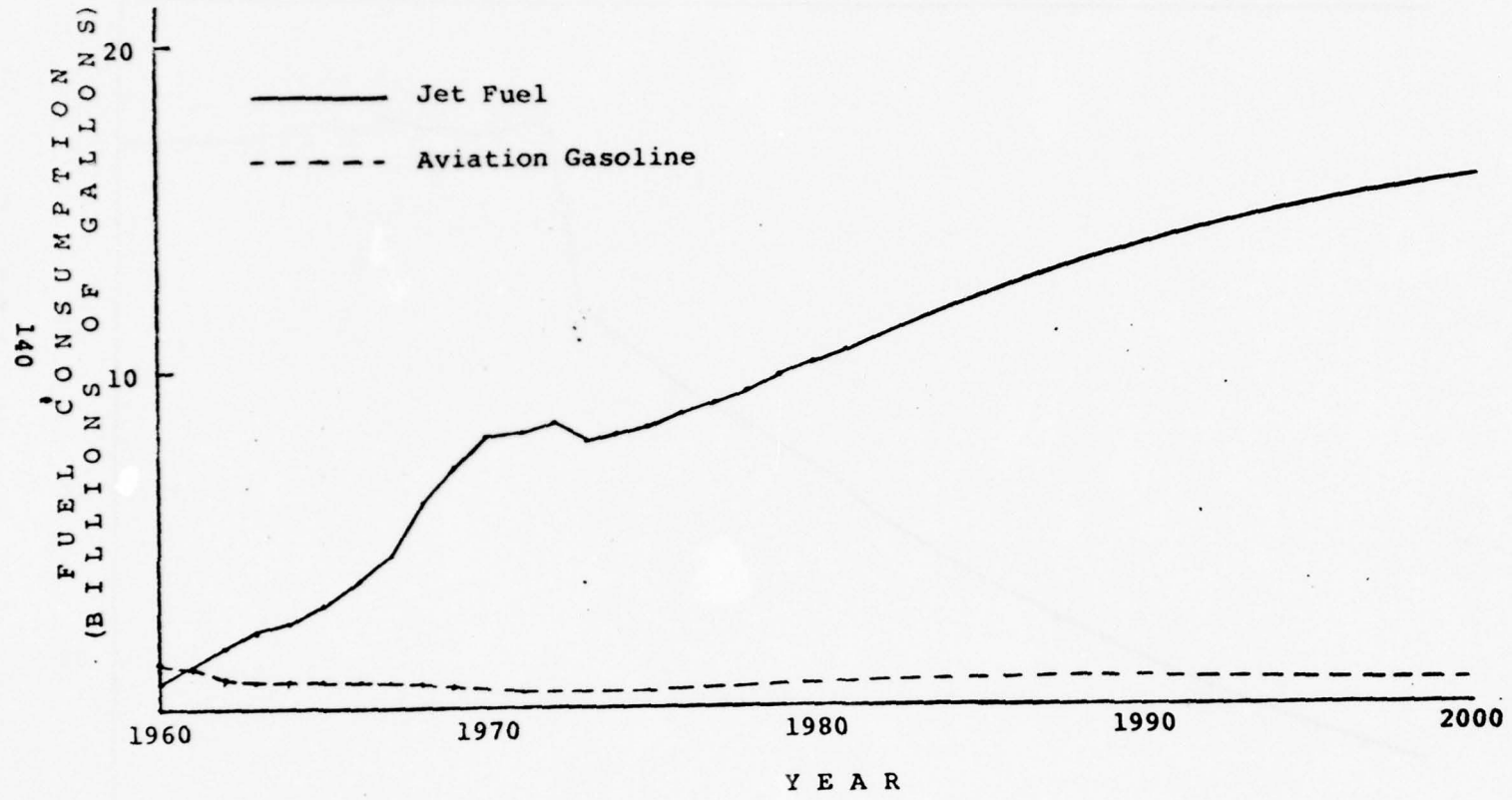


FIGURE 6

ALUMINUM - PRICE PER POUND, 99+ PERCENT VIRGIN INGOT
(CENTS/POUND - 1973 CONSTANT $)

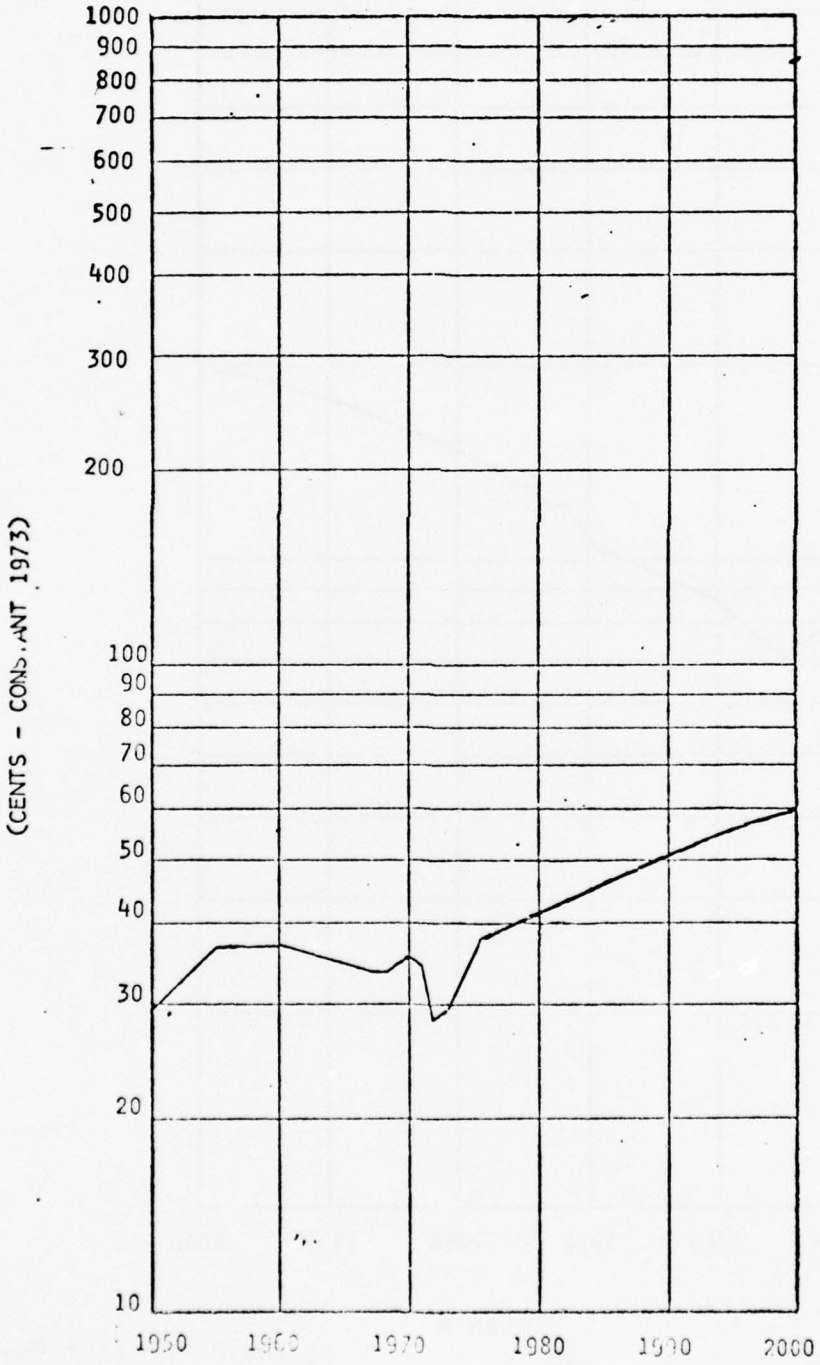


FIGURE 7

Source: Contract No. DOT-FA74WA-3510

IRON ORE - AVERAGE VALUE AT THE MINE PER LONG TON
(CONSTANT 1973 DOLLARS)

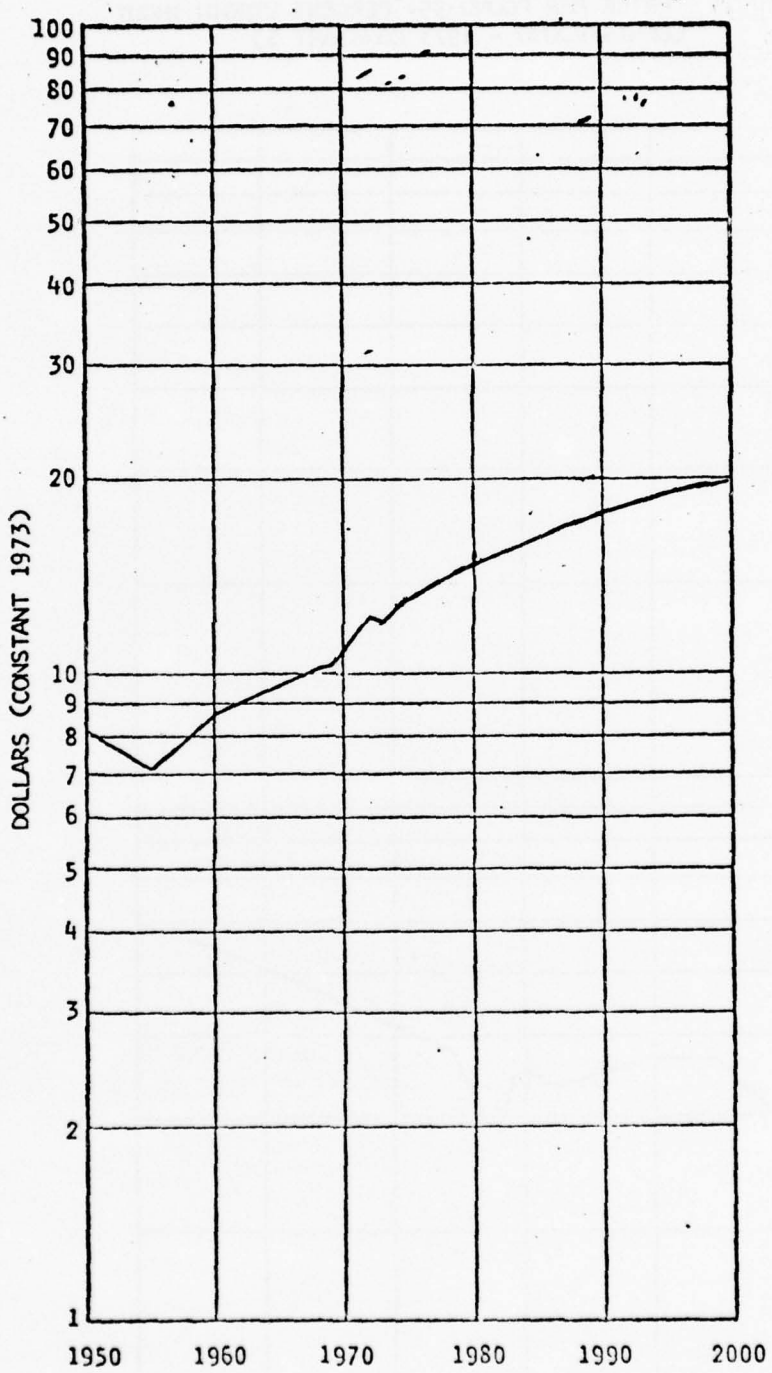


FIGURE 8

Source: Contract No. DOT-TA74WA-3510

Airport Access

In report No. FA-EM-74-5, performed by the MITRE Corporation for FAA, the subject of airport capacity was examined. Eight major airports were studied in detail:

Atlanta
Chicago, O'Hare
Denver
Los Angeles
Miami
N.Y. Kennedy
Philadelphia
San Francisco

The study team made no attempt to directly assess landside capacity but rather asked airport sponsors for an assessment of the estimated maximum enplanements capability of their airport, assuming all planned improvements. Table 5-5 shows the responses and a comparison with FAA and sponsor demand projections. For airports on which no sponsor capacity estimates were provided, a range based upon airport size was used. Six of the eight airports appear to reach a landside limit by 1985 or earlier. This will necessitate rather radical changes in the concepts of passenger processing, air carrier reliever airports, or new primary, high-density airports.

Table 31

LANDSIDE LIMITATIONS

	AIRPORT	ESTIMATED MAX ENPLANEMENTS	SATURATION (FAA DEMAND)	SPONSOR IDENTIFIED LIMIT
SPONSOR ESTIMATES	NEW YORK (JFK/LGA/EWR)	50 M	1984 (20M/14M/14M)	ACCESS
	O'HARE	27 M	1985	TERMINAL BLDGS. ACCESS MAY LIMIT SOONER
	LOS ANGELES	15 M (W/O FREEWAYS) 19 M (W/FREEWAYS+)	1978 1982	ACCESS, ENVIRONMENT
	SAN FRANCISCO	12 M (W/O TRANSIT) 15.5 M (W/TRANSIT)	1977 1981	ACCESS, MASS TRANSIT
SIZE ESTIMATES	DENVER	12 M - 15 M	1981 - 1984	CONTINUING AIRSIDE
	PHILADELPHIA	12 M - 15 M	1990 - 1995	POSSIBLE AIRSIDE
	MIAMI	12 M - 15 M	1982 - 1986	ACCESS
	ATLANTA	25 M - 30 M	1984 - 1988	POSSIBLE AIRSIDE

Task 6

Original Program:

Task 6 was originally stated as follows:

Implementation - In conjunction with the descriptions of the national aviation system provided through the accomplishment of the above cited tasks and activities, an implementation scheme will be developed covering all UG3RD items (excluding FSS and AFROSAT). This scheme will include (for each of the UG3RD items treated) establishment criteria; implementation strategy (distribution of facilities, e.g., hubs); implementation schedule (including IOC and FOC); and funding.

Modifications to Original Program:

None

STRAWMAN

ASTC IMPLEMENTATION STRATEGY AND SCHEDULE

Program Description

Airport Surface Traffic Control (ASTC) will provide the tools necessary to continue safe and efficient movement of air traffic on the surface of the airport in spite of increasing traffic, more complex mazes of runways and taxiways, and trends toward operations during periods of low visibility. Improved radar surveillance and rather simple stop/go and visual signals to the pilot are being implemented now. Automation of some of the control functions and improved displays and facilities for the local and ground controller located in the tower cab are planned for the future. These improvements will contribute to increase airport capacity and safety through reduced delays and the avoidance of collisions between aircraft and vehicular traffic on the airport surface.

Aircraft on approach and departure paths and on the airport surface are now controlled manually by air traffic controllers using visual observation, pilot reports and voice communication. At nine airports Airport Surface Detection Equipment (ASDE-2) radars are used primarily during poor visibility conditions. Television cameras are used at a few airports to provide visual surveillance of areas blocked from the controller's view.

The ASDE-2 system has limited value because of reliability and maintenance problems and the inadequate presentation and resolution of targets on the scope. Television cameras can cover only small areas and are adversely affected by poor visibility conditions. The problems of today's systems are caused by poor weather conditions, night operations, physical obstructions, complex airport configurations, the physical size of large airports with great distances between the tower and runways and taxiways, and high traffic counts.

The lack of an adequate ASTC has become a limiting factor in airport capacity at a few major airports because of backups and delays in the surface traffic flow. During peak traffic hours and also during periods of poor visibility an ASTC is needed to enable controllers to identify and keep track of traffic. A three-phase R&D effort is underway to develop and improve an efficient Airport Surface Traffic Control System.

Phase I--which is not part of the Upgraded Third Generation Air Traffic Control System, is nearly completed. This phase includes the development of modifications to existing ASDE-2 radars to improve performance and reliability, and the development of an improved PRITE system for existing ASDE-2 displays.

Also included in the Phase I program are a study to identify new equipment requirements, an examination of the technical feasibility and cost effectiveness of proposed systems, and a study to quantify requirements of Phase II and III systems.

Phase II-- will include the development of an advanced surveillance system, Tower Automated Ground Surveillance (TAGS), an automated intersection controller, an ASDE-3 radar and a multi-lateration surveillance technique. The TAGS system will be a computer-driven display based on either multi-lateration or digitized radar techniques as the sensor. The automatic intersection controller will include discrete sensors at intersections to detect vehicles and aircraft, a simple computer to determine the control command, airport surface lights to communicate the stop/go command to the pilot, and a monitor display and override console for the ATC controller.

Phase III-- would be an expansion of Phase II systems to include increased use of automatic control and guidance to the pilot under extremely low visibility conditions. The results of Phase I will determine the economical and technical parameters of this phase.

This phase could lead to a fully automated airport surface surveillance control and guidance system which would minimize the need for human intervention and provide guidance to the pilot operating under visibility conditions so poor that references to visual guidance would be impossible.

Implementation Strategy

Phase I development efforts will determine whether the TAGS system will be based on multi-lateration or digitized radar techniques. A tri-lateration system has been receiving primary emphasis with digitized ASDE-3 radar data as an alternate system. By 1985 approximately 30 TAGS systems will be needed based on current aviation forecasts. If the digitized radar technique is chosen, 30 ASDE-3 radars with 15 sets of TAG computers and displays will be required. If, as seems more probable, the multi-lateration technique is chosen, 15 complete TAG systems will be required and 15 ASDE-3 radars for those airports where a complete TAGS is not justifiable on a benefit/cost basis. The automatic intersection controller systems will be installed with the TAGS.

Criteria

The proposed criteria permit the installation of ASTC at airports with at lease 150,000 annual itinerant operations, of which 75,000 or more are air carrier. The distance from the ATCT to the farthest point on the airport, which is within the responsibility of tower controllers, should be equal to or greater than 5,000 feet. Twenty-five airport locations meet these criteria now, and by FY 1985 an additional six airport locations are forecasted to qualify.

Constraints/Assumptions

1. Engineering and development schedules and cost estimates will remain the same as those indicated in the January 1975 version of the "Overview and Assessment of the Development Program for the Upgraded Third Generation (UG3RD) ATC System."

2. The multi-lateration technique for TAGS and the development of an ASDE-3 are technically feasible.

3. The cost of the computer and displays will be approximately the same whether the digitized radar or multi-lateration technique is chosen.

4. Facilities and equipment funds will be available in the amounts needed in the fiscal years indicated.

5. There will be 15 TAGS systems and also 15 ASDE-3 radars without TAGS by FY 1985.

6. ASDE-2 radars will be decommissioned and replaced by TAGS systems.

7. There are no avionics costs with ASTC; however, approximately $40,000 for transponders on ground vehicles would be required at each airport equipped with the multilateration sensors.

Alternatives Considered

The alternative of not developing the ASTC would mean that the nine existing ASDE-2 radars would continue to be used. When the ASDE-2 improvement program is completed these nine ASDE-2's plus three from agency material inventories will be commissioned. These radars would continue to be subject to reliability and maintenance problems. The outages due to rain when the radars are most needed cannot be prevented because this problem is inherent to the frequency at which the radars operate. By FY 1985 there would still be 19 airports without any airport surface control system. Without ASTC it is futile to develop Category III precision approach and landing systems becuase the aircraft which has landed would be incapable of safety taxiing from the runway to the

ramp. At major airports the capacity is reduced to 23 percent of the normal capacity during the 5 percent of the time that these airports operate under Category II conditions because of the lack of ASTC.

Although this alternative does not require additional funds, the capacity and safety costs are high.

A detailed draft transition plan for ASTC will be prepared by June 1976.

Figure 9

ASTC PROGRAM 1/ SCHEDULES, MAJOR MILESTONES AND RESOURCE REQUIREMENTS

+(TITLE OF FEATURE)

PROGRAM PHASES OR ELEMENTS

CALENDAR YEAR	CY75	CY76	CY77	CY78	CY79	CY80	CY81	CY82	CY83	CY84	CY85	CY86	CY87	CY88	CY89	CY90
FISCAL YEAR	FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90
. E&D SCHEDULE																
Surveillance Technique:																
. Radar					Digitized Radar Sys.											
. Beacon Tri-Lateration					ATCRBS Based Surv. Sys.											
					DABS Based Surv. Sys.											
E&D FUNDING (FY)	$1.6M	$2.5M	$2.0M	$3.0M												
MAJOR MILESTONES & DECISIONS POINTS — E & D		TAGS Technique & design selected.			TAGS Development Complete.											
		Cost/Benefit Analysis Development Plan			TAGS Development Initiated.											
F & E			TAG Implem. Strategy & Plan A			TAGS Implen. Decision.										
			Draft Transition Plan													
F&E SCHEDULE UNITS																
TAGS					1	5	5	4	-	-	-					
Automatic Intersection Controller					1	5	5	4	-	-	-					
ASDE-3					-	-	-	1	5	5	5					
Signature					1	5	5	4	-	-	-					
F&E Funding (FY)				$1.0M	$4.5M	$4.5M	$5.5M	$4.5M	$4.5 M	$4.5M						

1/ ASP ASTC Transition Plan may significantly alter the above schedules.

WAKE VORTEX AVOIDANCE SYSTEM

Implement WVAS

Program Description

Aircraft in flight generate two counter-rotating masses of air which are termed wake vortices. The energy contained in a vortex is directly proportional to aircraft weight and inversely proportional to aircraft speed. With the advent of wide-bodied jets hazardous wake vortex encounters have become a safety consideration, especially at lower altitudes where there is little time for recovery by the following aircraft. To minimize the probability of wake vortex encounter, the FAA increased the minimum longitudinal separation between aircraft. Although this procedural change was effective in maintaining safety, it had the undesirable side effect of reducing airport arrival and departure capacity. Since 1972 the agency has been involved in a research and development program to produce a Wake Vortex Avoidance System (WVAS).

The initial effort in the R&D program was the compilation of data on the dynamics of wake vortex phenomena. The data indicates (1) that most vortices move quickly away from the flight path and (2) that the duration, intensity, and path of a vortex is a function of a given aircraft's generating characteristics and existing meteorological conditions.

These findings have provided the foundation for the early phase of the R&D program which has been devoted to the development of a simplified logic system based on wind direction and velocity, using sensors to warn of the presence of vortices in the flight path. A later phase will provide sensor/prediction capabilities and, finally, the WVAS will be interfaced with the ARTS III, if required.

This transition plan is to provide for the implementation of the several phases of the WVAS into the Upgraded Third Generation ATC System.

Implementation Strategy

The Wake Vortex Avoidance System will be implemented at those major airports where delay avoidance and safety benefits will justify its cost. During the 1978-2000 time frame of this plan it is projected that 28 runways will have enough traffic to qualify for WVAS.

Criteria

This strawman implementation plan uses temporary qualification criteria developed by ASP-100. They are as follows:

> Criteria--tentatively 200,000 annual itinerant operations of which 10,000 or more (about two an hour from 0700 through 2200) are heavy jets. (Note: If data of this kind are not available, a proxy criterion can be used; i.e., install WVAS at all large hub airports.)

Constraints/Assumptions

The WVAS is conceptualized as a technological means to eliminate the need for the extended longitudinal spacing instituted because of the wake vortex problem. The economic rationale for the implementation of the system is based on the following assumptions:

Performance--Successful development of the WVAS will result in substantial increases in effective airport capacity on the order of 15 percent today and up to 40 percent with the fleet mix anticipated for the year 1980.

Safety Considerations--Avoidance of vortex encounter accidents is now achieved through extended spacing. The assumption is that WVAS will permit a variable adjustment of spacing without degradation of air safety in the arrival and departure corridors.

F&E COSTS

COSTS/MANPOWER/FACILITIES

The number and type of WVAS components in a given system are determined by the requirements of the airport and its traffic profiles. The modular design of the system will permit a broad spectrum of possible combinations of the subsystems to satisfy these specific local requirements. The costs of the WVAS, therefore, vary with the site and are a direct function of the quality of service desired from the system.

Implementation Schedule

FY	80	81	82	83	84	85	86	87	88-2000
Units	5	5	5	3	3	3	2	2	--
Costs $M	5	5	5	3	3	3	2	2	--

Presently estimated implementation costs are $200,000 to $400,000 per runway end plus a $100,000 ARTS III modification cost at each airport.

ALTERNATIVES CONSIDERED

Implement Parallel Runways--An alternative to the WVAS is not to implement a technological fix to the wake turbulence problem. Instead, in order to compensate for the safety hazard and capacity losses associated with vortex phenomena,

additional runways may be constructed at large hub airports. The alternative scenario, then, will be to increase the number of runways and thus provide alternate parallel landing areas which will be used for simultaneous operations is many airports because of operational and runway configuration conflicts and land availability. The alternative, in these cases, will be to continue extended longitudinal spacing in the approach and departure corridors.

Implementation Strategy

Additional runways may not be provided at the same locations which would qualify for WVAS implementation. However, the ranking strategy for implementation will be based on considerations of delay avoidance costs and safety benefits.

Criteria

For the purpose of this strawman scenario qualification standards provided by Order 5100.7 will govern the decision to construct an additional runway. A second runway will be provided only if the benefit derived from avoidance of wake turbulence warrants the expenditure of ADAP funds for this purpose.

Constraints/Assumptions

The program to provide additional runways is based on several assumptions.

-- WVAS will not be adopted by the FAA.

-- Wake vortices will continue to present a delay problem and safety hazard to following aircraft.

-- Vortex avoidance benefits from added runways will exceed costs of construction.

Schedules

Since construction costs of additional runways are dependent upon a number of site-specific variables, for this strawman plan schedules of development and establishment rates and costs are not provided.

DABS/IPC

Implement DABS/IPC

Program Description

Discrete Address Beacon System (DABS) is a ground-based, cooperative electronic interrogator and response system for aircraft surveillance and data link communications being developed as a compatible replacement for ATCRBS. Surveillance capability is expected to provide a range measurement accurate to about 125 feet and azimuth bearings accurate to about 0.1 degree. A data link capability of segmenting 50 bit messages is included in the signal format design.

Intermittent Positive Control (IPC) is a ground-based collision avoidance system using DABS surveillance and data link communications and computer tracking to provide automatic warning and maneuver commands to DABS/IPC equipped aircraft to avoid potential collision hazards with other beacon-equipped aircraft.

Implementation Strategy

The implementation strategy envisions a program of modular expansion of the existing ATCRBS through a full DABS. To accomplish this, a three-phased approach will be followed. This approach will permit complete familiarization and acceptance of each phase prior to the introduction of the next level of complexity.

The first phase will be the improvement of all the existing or planned ATCRBS. The improvements will include new antennas (probably improved Open Arrays), monopulse angle measurement capability, and site originated target declaration.

The second phase would be the installation of discrete addressing capability at all the sites serving either an ARTCC or ARTS III facility. This is estimated to be 131 en route and 64 terminal locations.

The third phase would be the establishment of data link capability and associated message service at all en route locations (131) and at selected high density terminal areas (25).

Criteria

Based on the assumption that the existing primary radar systems, both enroute and terminal, will be continued until 2000, all existing and planned ATCRBS facilities will be replaced by DABS equipment. However, it is anticipated that DABS in terminal areas would provide data to ARTCC's and vice versa.

Locations Meeting Criteria for ATCRBS

	Commissioned or Programmed thru FY 1976	Additional Candidates by 1980	1985	1990	1995	2000	Total
En Route	131	-	-	-	-	-	131
Terminal	182	10	15	12	6	2	227
	313	10	15	12	6	2	358

(1) The new (draft) ASR criteria were applied to terminal area forecasts thru FY 2000. The new criteria range from 45,000 itinerant/10,000 air carrier/18,000 instrument operations to 105,000 itinerant/4,000 air carrier/27,000 instrument operations.

Constraints/Assumptions

Due to the interrelationships of the antennas, monopulse techniques, processing requirements, and the signal structures between an improved ATCRBS, and DABS, it is assumed that DABS ground sites can be introduced gradually into the ongoing ATC system. This process will provide immediate benefits which are associated with the improved surveillance capability (antennas and monopulse processing), followed by subsequent increased levels of services, e.g., data link, etc.

It is also assumed that traffic densities, as well as passenger densities per aircraft, will continue to increase which, in turn, will place increasingly higher levels of demand on the ATC system.

Schedules

ASP DABS/IPC Transition Plan - June 1977

Figure 10

DABS/IPC 1/
(TITLE OF FEATURE)

SCHEDULES, MAJOR MILESTONES AND RESOURCE REQUIREMENTS

CALENDAR YEAR		CY75	CY76	CY77	CY78	CY79	CY80	CY81	CY82	CY83	CY84	CY85	CY86	CY87	CY88 CY89		CY90	
FISCAL YEAR		FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90	
PROGRAM PHASES OR ELEMENTS	END SCHEDULE																	
	DABS																	
	Phase I				Experimental Tests													
	Phase II				System Engineering and Evaluation													
	IPC																	
	Development & Test				Flight-DABS/F													
	Prototype Development				Simulation-NAFEC													
					Test with DABS, ARTS, NAS													
	F&E FUNDING (FY) (millions)	7.1		11.7	13.0	15.1			50.8									
	MAJOR MILESTONES & DECISION POINTS	E & D	Award Sensor Development Contract		Deliver 1st Sensor to NAFEC	Begin Operational Trials		Complete Sensor Production Specifications										
		F & E			Implementation Decision		Award Production Contract		Initial Operating Capability (IOC)								Full Operational Capability (FOC)	
	F&E SCHEDULE UNITS																	TOTAL
	DABS	Production Units					10	40	50	50	50	50	50	50	50	20		420
		F&E Funding					5.8	24.1	29.9	29.9	29.9	30.4	34.5	34.7	34.5	13.7		
	IPC	Production Units					10	40	50	50	50	50	50	50	50	20		420
		F&E Funding					1.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0		
	F&E FUNDING (FY) (millions)						6.8	28.1	34.9	34.9	34.9	35.4	39.5	39.7	39.5	15.7		309.4

1/ ASF DABS/IPC Transition Plan may significantly alter the above schedules.

Alternatives Considered

There are several alternatives to implementing DABS/IPC such as improved ATCRBS or continuing the present surveillance system. For the purposes of this scenario, the alternative of continuing the present system will be used.

Implementation Strategy

Assuming that the present ATCRBS has an expected life of 20 years, all the existing or planned ATCRBS will be replaced before the year 2000. In fact, the equipment to be installed by 1980 will require replacement by the turn of the century. Based on the criteria, 371 locations would be reequipped by 2000. This alternative strategy would be to replace obsolete systems based on their age since design. This strategy assures that the older equipment would be removed from service as soon as possible and encourages a maintenance philosophy of zero growth, i.e., no additional manpower required for new equipment.

Schedules

The following schedules and costs are lumped into 5-year groupings based on life-cycle replacements as well as new qualifiers. The costs are estimated at approximately $130K per site.

	1975-79	1980-84	1985-89	1990-94	1995-99
Replacements	3	170	87	53	13
New Qualifiers	10	15	12	6	2
Total Units	13	185	99	56	15
Cost/millions	1.7	24.1	12.1	7.7	2.0

RNAV

Implement RNAV

Program Description

Area navigation (RNAV) is a method of aircraft navigation which derives position information from ground based electronic aids without the requirement of the aircraft being routed directly toward or away from the navaid. Degrees of RNAV are two dimensional (2D) which provides azimuth and distance information, three dimensional (3D) which incorporates altitude data, and (4D) which adds the fourth dimension, time.

Although there are a number of navigational aids which can be used for RNAV, it is most likely that the VORTAC-VOR/DME system will serve as the ground-based component of the UG3RD feature. Necessary avionics range from uncomplicated, relatively inexpensive 2D systems with one or two waypoint capability coupled with simple pilot displays to complex, high cost systems with multiple waypoint capabilities coupled with aircraft flight director and/or autopilot systems.

Implementation Strategy

The RNAV concept has been under consideration for a number of years and is actually in a state of preliminary implementation. Use of the RNAV system is voluntary. Plans are to implement RNAV in three phases, the first of which is design to establish RNAV in the high altitude airspace and to design and install RNAV arrival and departure procedures at high density terminals.

The second phase includes designation of RNAV routes in the low altitude airspace and establishment of terminal procedures at less high and medium density terminals. The third phase involves elimination of all conventional VOR airways except for a rudimentary structure which can accommodate non-RNAV equipped aircraft. Parallel routes and 3D procedures will be established in all three phases; however, implementation of 4D procedures will rely on establishment of automatic metering and spacing.

The following numbers of RNAV routes and procedures are projected to be implemented by 1985.

High Altitude Routes	200
Low Altitude Routes	200
Parallel offsets Routes	500
Three dimensional Routes	1000
Approach and landing Procedures	900

FAA Funding required for RNAV is estimated to be:

	75	76	77	78	79+
E&D	1.0	2.6	1.4	1.0	5.4
F&E	-Less than $10 M----------				
O&M	*				

*A dollar figure cannot be accurately estimated for O&M costs; however, expenses involved will consist of coordination required in setting up routes and the flight checking of the routes.

Criteria

No criteria have been established for implementation of RNAV elements (routes/procedures, etc.). Criteria for this "straw-man" will be the requirements identified in the FAA/Industry Task Force report entitled "Application of Area Navigation in the National Airspace System." These include the following:

- airspace procedures
- air traffic control procedures
- regulatory requirements
- equipment requirements
- system requirements
- research and development requirements
- time schedule

Constraints/Assumptions

The principal assumption is that preliminary payoff analyses will be supported by more thorough documentation and that present users of RNAV recognize benefits beyond those possible through continuation of the existing system.

This plan is also based on the assumption that RNAV implementation will proceed on a voluntary basis rather than as a response to regulatory requirements.

Cost to FAA for establishing RNAV will be minimal, since the basic ground based system is virtually in place. However, costs to users* could be substantial and will have a major impact on the final implementation decision.

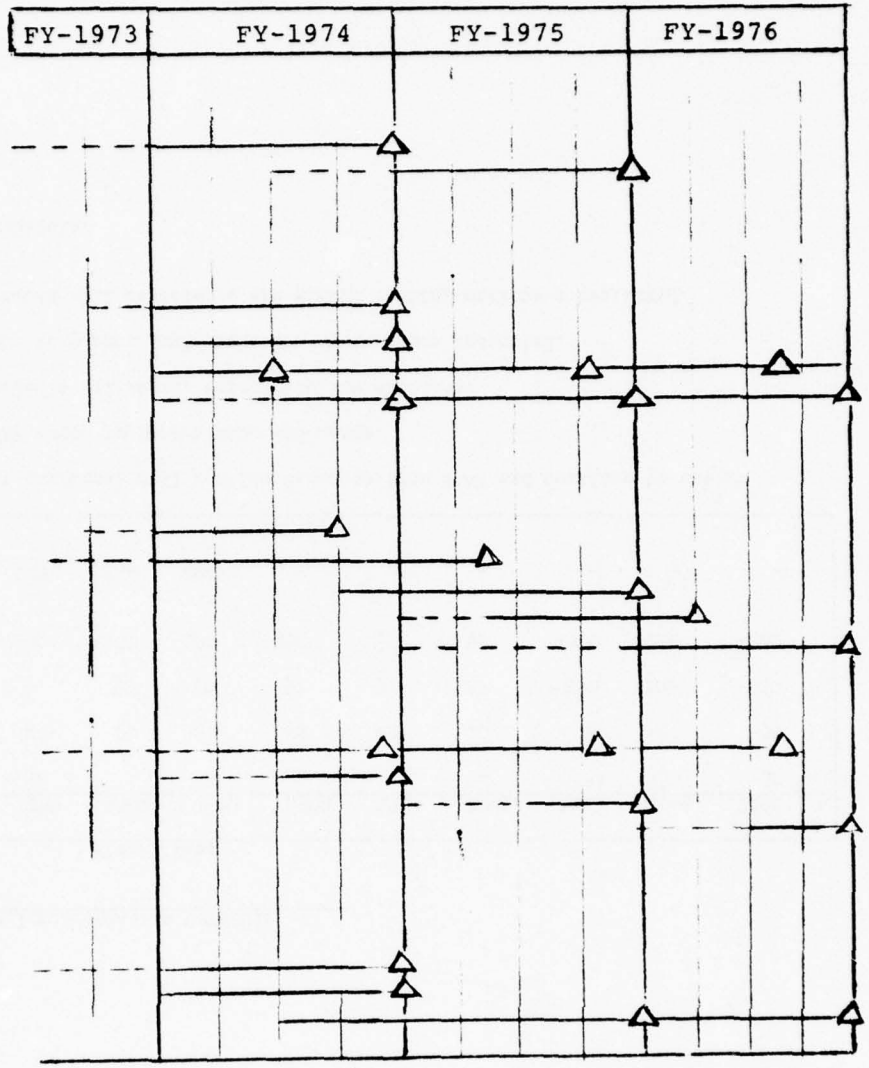
Schedules

ASP-RNAV "Transition Plan" - June 1977

*Avionics costs range from $2000 for a single waypoint system designed for light aircraft to over $100,000 for an inertial navigational system found on large jet air carriers.

Figure 11

E&D SCHEDULE*



PAYOFF ANALYSIS

- Preliminary User/System Payoff Report
- Final User/System Payoff Report

TERMINAL DESIGN

- Terminal Design Applications (all time periods)
- General Terminal Design Guidelines
- Real Time Simulations/Flight Validation
- Final Reports

EN ROUTE DESIGN

- High Altitude (50-150-250) Airport Pair Structure Design
- High Altitude Final Report
- Low Altitude Structure Designs
- Low Altitude Final Report
- Post 1982 Report

AVIONICS

- Flight Technical Error Reports
- Preliminary 2D/3D Standards Report
- 2D/3D Standards Report
- 4D Standards Report

SUPPORTING STUDIES

- Waypoint Study Report
- Route Width Study Report
- Post 1982 Analysis Reports

*(Dates are delivery of contractor reports for internal review)

Figure 12

RNAV Route and Terminal Procedure Implementation Schedule 1/

	Fiscal Year													
	Prior to 1976	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000
High Altitude Routes	163	-	7	10	10	10	-	-	-	-	-	-100	-50	-50
Low Altitude Routes	8	-	42	20	20	20	20	20	20	20	10	- 50	-50	-50
Parallel Offset Routes	0	-	100	100	50	50	50	50	50	30	20	-200	-100	-100
Three Dimensional Routes	0	-	100	100	200	200	100	100	100	50	50	-500	-200	-200
Approach and Landing Procedures	298	-	52	150	100	100	100	100	-	-	-	-	-	-

Assumptions:

1. Users of existing high altitude routes (primarily air carriers) will realize benefits from RNAV and continue to use it.
2. FAA will experience system benefits and encourage RNAV route implementation and usage.
3. Suitable avionics at reasonable costs will be available to all users, especially low altitude.
4. Required avionics and ATC procedures will be available to permit implementation at the rate indicated.
5. After 1985 all high altitude and most low altitude routes will be deleted and random routing will be substituted.

NOTE: 1. ASP RNAV Transition Plan may significantly alter the above schedule.

Alternatives Considered

The most likely alternative to implementing RNAV is continuing the present navigational system. F&E costs would vary little--both alternatives requiring maintenance and improvements to the existing VORTAC systems. This alternative would probably have little effect on current users of RNAV, since most fly the high altitude routes and are equipped with inertial navigation systems (this permits them to fly direct routes independent of ground-based navaids).

The costs for continuation of the VOR/VOR-TAC system in the F&E area would be for essential improvements and relocations and establishments to meet changing conditions. The F&E costs are shown on Figure 3.

Figure 13

Continuation of Existing VOR/VORTAC System

	F&E Implementation Plan (Amount in Millions)																				TOTAL	
	1976		1977		1978		1979		1980		1981		1982		1983		1984		1985			
ITEM	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt	Units	Amt
VOR/VORTAC																						
Establish	5	1.1	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	50	23.6
Relocate	4	1.2	5	2.0	3	1.0	3	1.0	3	1.0	4	2.0	4	2.0	4	2.0	4	2.0	4	2.0	38	16.2
Convert	1	.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	.2
Improve		1.9		7.5		20.0		20.0		20.0		12.7		12.0		12.0		12.0		12.0		130.1
Add DME to VOR	20	1.2	40	2.8	40	2.8	20	1.4	20	1.4	20	2.0	20	2.0	20	2.0	20	2.0	20	2.0	240	19.6
TOTALS		$5.6		$14.8		$26.3		$24.9		$24.9		$19.2		$18.5		$18.5		$18.5		$18.5		$180.7

Assumptions

1. F&E funds will be made available as required.

2. F&E personnel & equipment available as required.

UPGRADED AUTOMATION

IMPLEMENT UPGRADED AUTOMATION

Program Description

The Upgraded Automation program is a development effort to provide increased levels of automation in the control functions and to provide the interface modems to integrate other UG3RD features into the control system. The major upgraded capabilities included in the design are automated radar/beacon tracking conflict predictions, conflict alerts, metering and spacing of traffic and flow control.

Implementation Strategy

There are 20 ARTCC's equipped with the NAS Stage A system and 63 terminals with some form of ARTS III. All these computer systems are interconnected and exchange data continuously. Therefore, the planned implementation strategy is designed to avoid disrupting the integrity of those computers and of ATC services provided by those systems.

Since most of the upgraded features depend on the en route and terminal computers, it will be necessary, as a first step, to upgrade the architecture of the computer systems to assure the required capacity as well as reliability for future needs. This expansion will affect 20 ARTCCs and 14 terminals.

Parallel with the computer expansion program would be three en route software efforts--local en route metering, conflict alerts, and flight plan probes--and two terminal software efforts-safe altitude warning and conflict prediction. Combined with these efforts would be the terminal metering and spacing program which is divided into two phases--basic arrivals at a single airport, and multiple arrivals and departures at numerous airports within one hub area.

Subsequently, the en route metering program would be implemented as a follow-on to the terminal metering and spacing effort. The control sector design efforts, either en route or terminal, would be follow-on efforts as would be the control message automation efforts which are based on the DABS data link capability.

Criteria

En Route. Install components justified by a cost-benefit analysis in all ARTCCs.

Terminal. Install components which have justified by a cost-benefit analysis at all ARTS III locations which have 200,000 or more annual air carrier operations.

Constraints and Assumptions

The programs related to computer expansion pace the whole improved automation effort. Delays in this area would virtually guarantee that the implementation of the other features would be forced to "hold" while the computer systems catch up.

Schedules

ASP Automation Transition Plan - April 1976

Figure 14

SCHEDULES, MAJOR MILESTONES AND RESOURCE REQUIREMENTS

Automation--En Route Control 1/

(TITLE OF FEATURE)

PROGRAM PHASES OR ELEMENTS

CALENDAR YEAR	CY75	CY76	CY77	CY78	CY79	CY80	CY81	CY82	CY83	CY84	CY85	CY86	CY87	CY88	CY89	CY 90
FISCAL YEAR	FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90
E&D SCHEDULE En Route Control																
Conflict Alerts	T&E															
Flt.Plan Conflict Probe	D,TCE															
Control Message Auto.	Development & Simulation															
Control Sector Design	Experimentation Decision on Advanced Development															
Local En Route Metering																
En Route Metering																
Computer Expansion	Fail Soft	Advanced Development														
E&D FUNDING (FY)	6.0M	7.6M	10.8M	11.0M			55.0M									
MAJOR MILESTONES & DECISIONS POINTS	E & D															
	F& & E			Initial Operating Capability (IOC)				Full Operating Capability (FOC)								
F&E SCHEDULE UNITS																
Conflict Alert			5	15												
Flt.Plan Conflect Probe			5	15												
Control Message Auto.							5	15								
Control Sector Design 2/				5	5	5	5									
Local EnRoute Metering			20													
En Route Metering				10	10											
Computer Expansion 2/			20													
F&E Funding (millions)			10.0	5.0	5.0	5.0	5.0									

1/ ASP Automation Transition Plan may significantly alter the above schedules.

2/ F&E funds required.

Figure 15

SCHEDULES, MAJOR MILESTONES AND RESOURCE REQUIREMENTS

Automation--Terminal Control 1/

(TITLE OF FEATURE)

CALENDAR YEAR	CY75	CY76	CY77	CY78	CY79	CY80	CY81	CY82	CY83	CY84	CY85	CY86	CY87	CY88	CY89	CY90
FISCAL YEAR	FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY 88	FY89	FY90

PROGRAM PHASES OR ELEMENTS

E&D SCHEDULE

Terminal Control

- Metering & Control: Basic Arrs. (Multiple App.& Dep.) (Hardware/Software)
- Conflict Predictions Alerts: (Software)
- Safe Altitude Warning
- Control Message Automation: Dev. depends on DABS (Hardware/Software)
- Control Sector Design: (Hardware/Software)
- Computer Expansion: Fail safe

E&D FUNDING (FY): 4.2M | 6.1M | 9.7M | 12.6M | 64.9M

MAJOR MILESTONES & DECISIONS POINTS

- E & D
- F & E

▽ Initial Operating Capability (IOC)

▽ Full Operating Capability (FOC)

F&E SCHEDULE UNITS

Metering & Spacing*			10	10*	8							5				
Conflict Alerts (Prediction)			5	9								5				
Altitude Warning, Safe			21	21	21											
Control Message Auto						4	10					5				
Control Sector Design 2/				5	5	4						5				
Computer Expansion 2/			10	4								5				

* (2 Overlapping Programs)

F&E Funding (millions): 5.0 | 4.0 | 2.0 | 2.0 | 5.0

1/ ASP Automation Transition Plan may significantly alter the above schedules.

2/ F&E funds required

Automatic Flow Control 1/ **Figure 16** SCHEDULES, MAJOR MILESTONES AND RESOURCE REQUIREMENTS

(TITLE OF FEATURE)

CALENDAR YEAR		CY75	CY76	CY77	CY78	CY79	CY80	CY81	CY82	CY83	CY84	CY 85	CY86	CY87	CY88	CY89	CY90
FISCAL YEAR		FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90
PROGRAM PHASES OR ELEMENTS	E&D SCHEDULE																	
	Flow Control																	
	Dedicated Computer	Specifications																
	Upgraded AIRS II*	Development & Evaluation																
	Advanced Development	[— — — —																
	*Airport Information Retrieval System																	
	F&E FUNDING (FY)	0.5M	1.7M	2.3M	2.3M			5.0M										
	MAJOR MILESTONES & DECISIONS POINTS — E & D																	
	MAJOR MILESTONES & DECISIONS POINTS — F & E							Initial Operating Capability ▼			Full Operating Capability (FOC) ▼							
	F&E SCHEDULE UNITS																	
	Dedicated Computer		1															
	Upgraded AIRS II 2/																	
	Advanced Development 2/																	
	F&E Funding (millions)		7.6															

1/ ASP Automation Transition Plan may significantly alter the above schedules.

2/ Software program - no F&E

(Hardware/Software)

Alternatives Considered

A possible alternative to the Upgraded Automation Program is the continuation of the existing automation systems, both terminal and en route. This means that we would continue using the same operational procedures, that additional personnel, operating positions etc., would be needed to meet growth in system demand.

Implementation Strategy

The strategy for implementing this alternative is to provide additional computer capacity, operational sectors, communications equipment, etc., as traffic increases. Also, additional operations and maintenance personnel will be required to man the positions and maintain the equipment.

MLS
IMPLEMENTATION PLAN

Program Description

The present Instrument Landing System (ILS) was developed in the 1940's to meet the precision approach requirements of that era. Although the ILS technology has evolved through the years the system still retains several inherent shortcomings which impose operational constraints that are unacceptable in the present and projected terminal area airspace environment. These include susceptibility to reflections from terrain and structures in the site area and the limitation of a single fixed glide angle and approach path. The agency is presently involved in a research and development effort to produce a Microwave Landing System (MLS) which will overcome the deficiencies of the Instrument Approach System and which will also provide additional capabilities not available with the present system.

Implementation Strategy

The MLS Transition Working Group, in coordination with RTCA Special Committee 125, has identified 21 implementation options. The final strategy will most likely be a combination of two or more of the implementation options. The program will be phased in at a rate of 50 per year under a strategy which will take into account the following considerations:

-- Initial establishment locations will be selected which will encourage users to equip with MLS avionics early in the program.

-- Noise reduction benefits derived from curved and two segment approaches will be maximized in the early years.

-- ILS replacement will begin when more than 50 percent of the traffic using a runway is equipped with MLS avionics.

Criteria

a. Replacement Criteria--all existing ILS systems will be replaced by a Category I or greater capability MLS.

b. Category II/III MLS Criteria--large hub airports will be equipped with Category II/III MLS on each end of the primary instrument runway; if independent IFR approaches are conducted on parallel runways, Category II/III MLS will be installed at all four runway ends. Medium hub airports will be equipped with one Category II/III MLS.

c. Category I MLS Criteria--no distinction is made here between the basic Category I and the "small airport" MLS; if it is determined that there is an operationally significant difference between the two, perhaps an additional criterion should be added.

1. Large hub airports--average of six runways equipped with MLS (including Category II/III) by FY 2000.

2. Medium hub airports--average of four runways equipped with MLS (including Category II/III) by FY 2000.

3. Small hub airports--two MLS runways with any combination of 350 air carrier, 750 air taxi, or 3,000 general aviation AIA's; three MLS runways with any combination of 2,000 air carrier, 4,000 air taxi, or 15,000 AIA's.

4. Air carrier jet use, initial ILS--estimate new qualifier from aircraft fleet forecasts.

5. Other airports--one MLS runway with any combination of 350 air carrier, 400 air taxi or 1,500 general aviation AIA's; two MLS's with any combination of 700 air carrier, 750 air taxi or 3,000 general aviation AIA's.

Constraints/Assumptions

-- The MLS being developed under the joint NASA/DOD/FAA program will be selected as the international standard by ICAO.

-- The Service Test and Demonstration Program will not reveal significant technological problems and anticipated benefits will be realized from the system.

-- The implementation strategy selected will be acceptable to the users.

-- Production costs will not vary significantly from R&D estimates for ground and avionics equipment.

-- MLS will eventually replace the ILS.

Schedules

E&D Program

EVENTS/MILESTONES

Aug 1975	Draft MLS Transition Plan issued.
Sep 1975	Input guidance for FY 1978 Call for Estimates.
Nov 1975	First recommendation from Special Committee 125.
Dec 1975	Preliminary program justification available.
Feb 1976	Justification for FY 1978 budget (Spring Preview) due.
Mar 1976	Final Transition Plan prepared for AOA-1 approval.
Mar 1976	Prototype delivery begins.
Apr 1976	Extended Test and Demonstration Program begins.
Jun 1976	ICAO standard MLS selected.
Apr 1977	Technical Data packages to AAF.
Aug 1977	Extended Test and Demonstration Program completed.

See Figure 1 for additional information.

F&E Program

EVENTS/MILESTONES

Nov 1977	F&E production contract (if option exercised).
Nov 1978	F&E production delivery begins.
Nov 1978	F&E production contract (if option not exercised).
Nov 1979	F&E production delivery begins (if option not exercised).

Cost ($000)

Ground system (current R&D program estimates)

	Electronics	Other	Total
Small Community	$ 43	$ 59	$102
Basic, Category I	67	94	161
Expanded, Category II	408	191	599
Expanded, Category IIIa	524	255	779

Other includes initial spares, documentation, test equipment, site preparation, installation, training and flight inspection. Category I costs include a simplex DME, azimuth, elevation and a monitor. Category II costs include a more precise DME, more sophisticated monitor, and dual equipments for azimuth, elevation and DME (except antennas). Category III costs also include dual equipment for flare guidance and back azimuth, and a power conditioning system for a power backup.

Annual costs for operation and maintenance are estimated at:

($000)	Total	Capital Recovery	O&M
Small Community	$ 14	$ 6	$ 8
Category I	24	9	15
Category II	87	54	33
Category IIIa	110	69	41

Implementation Schedule (F&E)

Based on the preceding F&D schedule and implementation strategy the system will be implemented at the following rates:

FY	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000
Units*						50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
$ M	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	

See Figure 1 for additional information.

*Assumption is that implementation mix will be as follows:

70 percent CAT I; 20 percent CAT II; 10 percent CAT III.

The Landing System Transition Plan now under development by ASP may change the implementation rate significantly.

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Alternatives Considered

An alternative to the Microwave Landing System program will be a further development of the Instrument Landing System to improve its performance and reliability. A scenario describing such an alternative follows:

Program Description

This "strawman" program is the continuation of the effort to provide a more reliable precision approach aid through implementation of an improved Instrument Landing System. The program includes installation of new systems and state-of-the-art modifications to upgrade the performance of commissioned ILS's.

Implementation Strategy

The improved Instrument Landing System will be installed at new qualifiers and at those locations which have met qualification criteria but have not been equipped because of siting or technical difficulties. Existing systems will also be modified as appropriate to upgrade their performance and reliability.

Criteria

Current establishment criteria for the standard ILS will be used. As the improved systems become available it is anticipated that there will be a lowering of the required annual approach requirement for qualification as a candidate runway in recognition of the lower installation and operating costs of the improved ILS.

Constraints/Assumptions

-- The improved end-fire antennae will permit installation of ILS at sites that are not compatible with the standard ILS.

-- Circuit redesign and transition to solid-state modularity will improve performance and reliability at lower maintenance costs.

-- ILS signal structure will be less sensitive to environmental transients with the improved end-fire antennae.

-- More airports will qualify for the ILS because of the anticipated reduction in criteria.

-- All tube-type ILS's will be replaced by solid-state equipment.

F&E Costs

a. Category I ILS:	
-- Single channel	$ 200,000
-- Dual channel	250,000
b. Category II ILS:	750,000
c. Category III ILS:	1,000,000

Annual costs for operation and maintenance are:

-- Category I ILS:	$ 35,000
-- Category II ILS:	75,000
-- Category III ILS:	100,000

F&E Implementation Schedule

FY	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000
Units*	10	10	10	20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40
$M	5	5	5	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	20	20	20	20	20

Assumption is that implementation mix will be as follows:

50 percent CAT I; 40 percent CAT II; 10 percent CAT III.